# Megabit Modem®
# MM701G2 & MM702G2
## User Manual


Product Catalog: MM701G2 and MM702G2

Document Number: MM70xG2-UM-03

# REVISION HISTORY

The Revision History provides a summary of any changes in this manual. Please make sure you are using the latest revision of this manual.

| Revision | Release Date | Revisions Made |
|---|---|---|
| 01 | April 9, 2004 | Initial release. |
| 02 | November 22, 2005 | Minor changes to factory default restore procedure and rebranding. |
| 03 | April 14, 2006 | Misc. Technical Updates. |

This manual is available online at ADC's website (www.adc.com/documentationlibrary/) or you can order copies of the manual by contacting your sales representative. Please ask for document MM70xG2-UM-03.

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# ABOUT THIS MANUAL

## INTRODUCTION

This manual applies to the ADC® Megabit Modem® versions MM701G2 and MM702G2. These modems can be used in two types of applications:

- as an endpoint (CPE) to a DSLAM for Internet and other broadband connection through a service provider
- as a LAN extension by implementing a point-to-point connection with another modem of the same model (MM701G2 to MM701G2 or MM702G2 to MM702G2)

## ORGANIZATION

To complete an endpoint installation for an MM701G2 or MM702G2 modem, follow the configuration instructions in all chapters of this manual, with the exception of Chapter 7: Implementing a Point-To-Point LAN Extension.

To complete a point-to-point installation for two MM701G2 or two MM702G2 modems, follow the configuration instructions in these chapters only:

- Chapter 1: Installation
- Chapter 2: Accessing the Web Interface for Modem Management
- Chapter 5: Configuring System Parameters
- Chapter 7: Implementing a Point-To-Point LAN Extension
- Chapter 8: Configuring NAT

After configuring the modem(s) for your application, monitor its status and perform other management functions using the instructions in Chapter 9: Managing the Modem. If you choose to manage the modem through the console port, use the instructions in Appendix A: Command Line Interface Access.

## INTENDED AUDIENCE

This manual is intended for anyone who installs, configures, and manages the ADC Megabit Modem versions MM701G2 and MM702G2.

## CONVENTIONS

The following style conventions and terminology are used throughout this guide.

| Element | Meaning |
|---|---|
| Bold font | Text that you must input exactly as shown (e.g., type **1** for card 1), menu buttons (e.g., **ACCEPT SHELF OPTIONS**) or menu screen options (e.g., **ALARMS** screen) that you must select |
| Italic font | Variables that you must determine before inputting the correct value (e.g., *Password* ) |
| Monospace font | References to screen prompts (e.g., Invalid Password...Try Again:.) |

| Reader Alert | Meaning |
|---|---|
|  | Alerts you to supplementary information |
| ***IMPORTANT***  | Alerts you to supplementary information that is essential to the completion of a task |

| Reader Alert | Meaning |
|---|---|
|   | Alerts you to possible equipment damage from electrostatic discharge |
| CAUTION | Alerts you to possible data loss, service-affecting procedures, or other similar type problems |
|   | Alerts you that failure to take or avoid a specific action might result in hardware damage or loss of service |
|   | Alerts you that failure to take or avoid a specific action might result in personal harm |

## INSPECTING YOUR SHIPMENT

Upon receipt of the equipment:

- Unpack each container and visually inspect the contents for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to ADC. Order replacement equipment, if necessary.
- Check the packing list to ensure complete and accurate shipment of each listed item. If the shipment is short or irregular, contact ADC as described in Appendix C: Product Support on page C-1. If you must store the equipment for a prolonged period, store the equipment in its original container.

## FCC CLASS B COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## EU COMPLIANCE

This product has been CE marked in accordance with the requirements of European Directive 73/23/EEC; the following mentioned product is in conformity with Low Voltage Directive 73/23/EEC in order to comply with the requirements in the Council Directive 73/23/EEC relating to electrical equipment designed for use within certain voltage limits and the Amendment Directive 93/68/EEC.

For safety evaluation of the compliance with this Directive 73/23/EEC, these standards were applied: IEC 60950:1999, EN 60950:2000.

# Chapter 1

# INSTALLATION

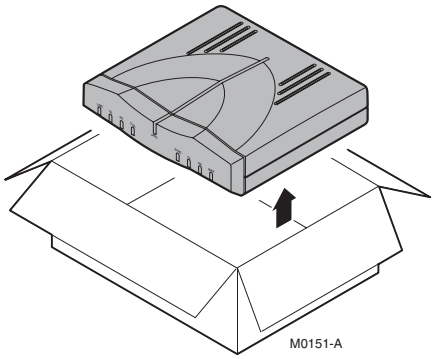
## OVERVIEW

The MM701G2 and MM702G2 are versatile, high-speed modems that connect an Ethernet LAN to one or more service providers using G.shdsl transmission technology. The connections provide instant and high-speed broadband access to the Internet or to other types of Wide Area Networks (WANs). The MM701G2 and MM702G2 provide the following:

- Configuration either as a point-to-point LAN extension or as an end-connection to a DSLAM (see "Organization" on page xiii for the process you must follow to complete either installation)
- Larger packet sizes to accommodate VLAN traffic (Maximum Ethernet Frame = 1536 bytes)
- 32 simultaneous Bridge/Router or PPP sessions to the same or different service providers over the WAN interface
- Protocols and services such as DHCP server, DNS Relay, NAT, OAM, and RIP

## UNPACK THE MODEM

If you store the modem for a long period of time, use the original antistatic bag and packaging. Observe environmental specifications as provided in Appendix B: Specifications.

| Step | Action |
|---|---|
| 1 | Remove the modem from the packaging (see Figure 1-1).<br>  <br><br>**Figure 1-1. Remove the Modem** |
| 2 | Visually inspect the container for signs of damage. If the equipment was damaged in transit, report the damage to the transportation company and to the sales representative. |
| 3 | Check the contents of the package for:<br>• 6 Vdc power supply with cord<br>• Black CAT5 cable for Ethernet connection<br>• Silver cord for DSL connection<br>• Flat cable (gray) and DB-9 port adapter for console port connection<br>• USB cable |

## DETERMINE WHAT YOU NEED

In addition to what is shipped with the modem, you need the following hardware and software to complete the installation and configuration.

**Table 1-1. Required Equipment**

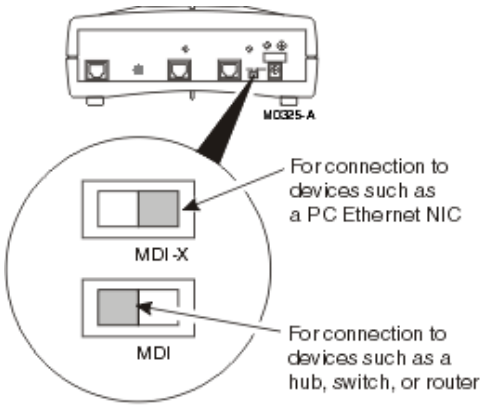
| Equipment: | Requirement: |
|---|---|
| **PC** | ***Hardware:*** |
| | Ethernet NIC Card (10 Mbps) installed in each PC and other network equipment that will be connected to the LAN. Verify if the NIC in the device which directly connects to the modem LAN port is half- or full-duplex. The modem LAN port must be set to the same transmission direction(s) as the NIC. |
| | Optional—serial interface card installed in PC (used for access to the modem console port). |
| | ***Software:*** |
| | TCP/IP protocol stack installed (see the operating system documentation for information). |
| | Terminal emulation program (such as HyperTerminal) installed for access to the command line interface through the console port (see the operating system documentation for information). |
| | Web browser installed (such as, Internet Explorer® Version 4.0 or higher). |
| | Operating System CD-ROM (Win98, Win98SE, Win2000, WinME, or WinXP). |
| **Ethernet hub, switch, or router** | Optional—use either a hub, switch, or a router to connect multiple PCs or other LAN equipment to the modem's Ethernet 10/100Base-T port (LAN port). |

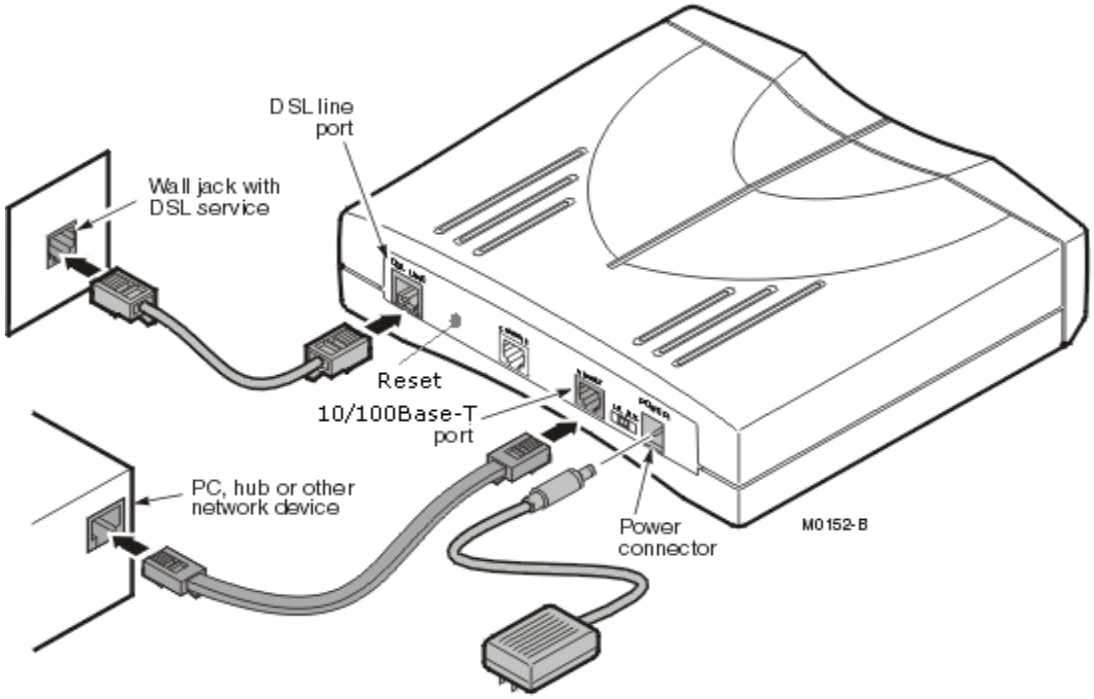
## CONNECT CABLES

Install cables for the Ethernet port (see "Connect the 10/100Base-T Port" below). Then check "LED Status Indications" on page 1-5.

### Connect the 10/100Base-T Port

Set the modem MDI/MDI-X switch for the 10/100Base-T port to allow the modem to connect directly to other network devices such as a PC, hub, switch, or router.

| Step | Action |
|---|---|
| 1 | Set the modem MDI/MDI-X switch (see Figure 1-2) to one of the following:<br>• MDI-X when connecting to a device such as a PC Ethernet NIC card that has an MDI port<br>• MDI when connecting to a device such as a hub, switch, or router that have MDI-X ports<br>  <br>**Figure 1-2. Set the MDI/MDI-X Switch**<br>**Note:** Make sure the NIC in the PC and the modem LAN port are both set to either half- or full-duplex for the transmission direction(s). If you need to change the modem LAN port setting to match the NIC, follow the procedures in "Manage DSL" on page A-17 (half-duplex is the default setting). |

| Step | Action |
|---|---|
| 2 | Connect the cables to the modem rear panel as shown below in Figure 1-3:<br>• Silver cable to the DSL line port and wall jack<br>• Black Ethernet cable to the 10/100Base-T port and to another Ethernet device such as a PC, hub, or router<br>• Power cable to the modem power connector and to facility power<br>  <br><br>**Figure 1-3. Rear Panel Connections** |
| 3 | Refer to “LED Status Indications” on page 1-5 to verify modem status via LEDs. |

## LED Status Indications

The following table summarizes the modem's operational status as provided by the front panel LEDs.

**Table 1-2. LED Status Indicators**

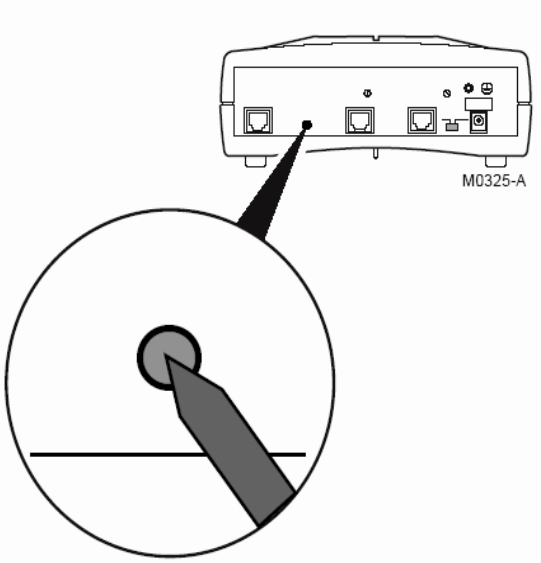
| LED | State | Description |
|---|---|---|
| PWR | On green | Modem has power. |
| | Off | Modem does not have power. |
| ***LAN*** | | |
| LINK | On green | A PC, hub, or other network device is connected to the modem 10/100Base-T interface. |
| | Off | No device is connected to the modem 10/100Base-T interface. |
| TX | Flashing green | Modem is transmitting data to devices on the LAN. |
| | Off | Modem is not transmitting data to the LAN. |
| RX | Flashing green | Modem is receiving data from devices on the LAN. |
| | Off | Modem is not receiving data from the LAN. |
| COL | Flashing green | Ethernet packet collisions are occurring. |
| | Off | No Ethernet packet collisions are occurring. |
| ***DSL*** | | |
| The service provider sets up the DSL parameters for your service. The modem must have the DSL SYNC LED lit before you can connect sessions. | | |
| SYNC | On green | DSL transceiver is synchronized (connected) and in normal operation mode. |
| | Flashing green | Slow flashing green indicates that the DSL transceiver is in a start-up or handshaking sequence. Fast flashing green indicates that the DSL transceiver is in training sequence. |
| | Off | Power is not connected. |
| TX | Flashing green | Modem is transmitting data over the DSL connection. |
| | Off | Modem is not transmitting data over the DSL connection. |
| RX | Flashing green | Modem is receiving data over the DSL connection. |
| | Off | Modem is not receiving data over the DSL connection. |
| MAR | On green | Local SNR Margin is greater than the SNR Margin Limit. |
| | Off | Local SNR Margin is less than the SNR Margin Limit. |

## REBOOTING THE MODEM WITH THE RESET BUTTON

The reset button on the back panel of your modem is provided to reboot the modem without the need to remove power.

Under normal circumstances, you will not have to use the reset button. On rare occasions, however, your modem may not respond. In this case, you need to perform a reset to get your modem running properly again (see "Rebooting the Modem" on page 5-14 for information about rebooting the modem from the Web Interface, and "Rebooting the Modem" on page A-29 for information about rebooting the modem from the Command Line Interface).

To perform a reboot:

| Step | Action |
|---|---|
| 1 | Use the tip of an unfolded paper clip (or similar object without a sharp tip) to gently press the Reset button on the back panel of your modem *for less than 5 seconds* (see Figure 1-4). The modem then reboots.<br><br>IMPORTANT<br>***Holding down on the Reset button for MORE than 5 seconds resets the modem to its factory default settings, essentially clearing all of your current configuration settings. For detailed information about resetting the modem's factory defaults:***<br>• ***Using the Web Interface, see "Reset to Factory Defaults using the Web Interface" on page 9-13.***<br>• ***Using the reset button on the back panel of the modem, see "Reset to Factory Defaults using the Reset Button" on page 9-14.***<br>• ***Using the Command Line Interface, see "Restoring Factory Defaults" on page A-27.***<br><br>  <br><br>**Figure 1-4. Reboot the Modem with the Reset Button** |

# Chapter 2

# ACCESSING THE WEB INTERFACE FOR MODEM MANAGEMENT

Use the Web interface as the most comprehensive and convenient way to set up and manage the modem. This chapter provides steps to help you access the Web interface pages for configuration and management of the modem.

Access to the command line interface is available through the modem console port or over a network using a telnet session. Not all configuration and management features, however, are supported through the command line interface. See Appendix A: “Command Line Interface Access” on page A-1 for instruction on using the command line interface for configuration and management.

## ASSIGN IP ADDRESSES

To access the modem Web interface, the management PC must be on the same LAN IP subnet as the modem. Default values are shown to the right. Do one of the following:

| Modem Defaults | |
|---|---|
| Subnet: | 10.0.0.0 |
| Subnet Mask: | 255.255.255.0 |
| IP Address: | 10.0.0.1 |

- Change the management PC IP address so that it is on the same subnet as the modem (go to Step 1 below).
- Change the IP address of the modem 10/100Base-T (LAN) port to a value assigned by your network administrator using the command line interface (go to Appendix A: “Set Up the LAN” on page A-6).

Use the following steps to set up a management PC to be on the same subnet with the modem. (The example shows instructions for a PC that is running Microsoft Windows 98 SE; instructions for other operating systems may differ slightly.)

| Step | Action |
|---|---|
| 1 | From the Windows desktop, choose **Start \| Settings \| Control Panel** to open the Control Panel dialog. |
| 2 | From the Control Panel dialog, double-click the **Network** icon (shown to the right). The Network dialog is displayed.  Network |
| 3 | From the **Configuration** tab, double-click **TCP/IP** to display the TCP/IP Properties dialog (Figure 2-1). |

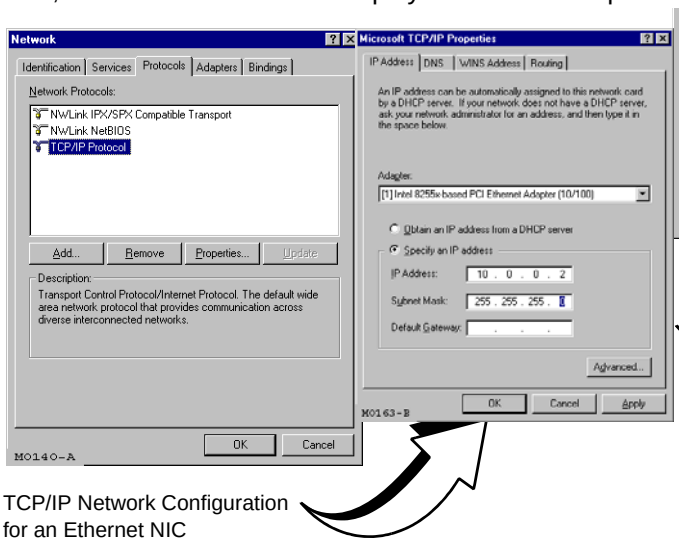
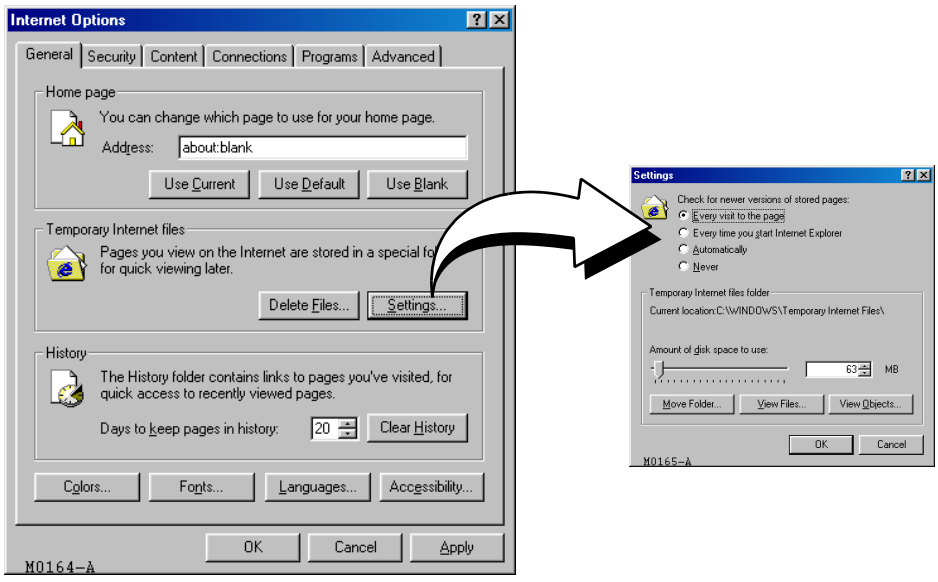


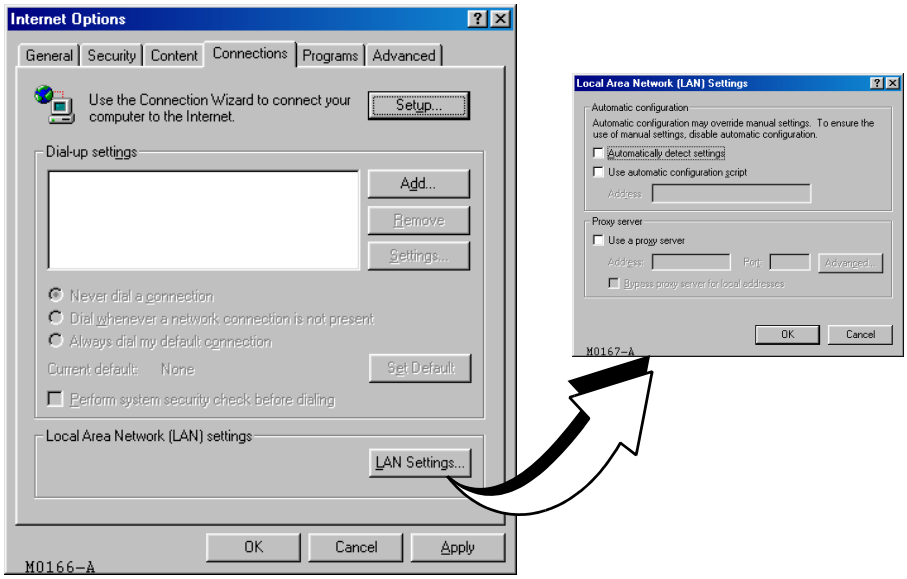

**Figure 2-1. TCP/IP Properties**

| Step | Action |
|---|---|
| 4 | The modem can be set up to serve IP addresses to devices on the LAN (DHCP server feature). Do one of the following:<br>• If DHCP server has not been enabled on the modem (default setting), select **Specify an IP address**.<br>• If DHCP server has been enabled on the modem, select **Obtain an IP address automatically** and go to Step 6. |
| 5 | Enter an **IP Address** and **Subnet Mask** that places the management PC on the same subnet as the modem. Use an IP address in the range of *10.0.0.2 to 10.0.0.254*. |
| 6 | Click **OK** to close the TCP/IP Properties dialog. |
| 7 | Click **OK** to close the Network dialog. |
| 8 | Click **OK** to restart the computer. |

## SET UP THE WEB BROWSER

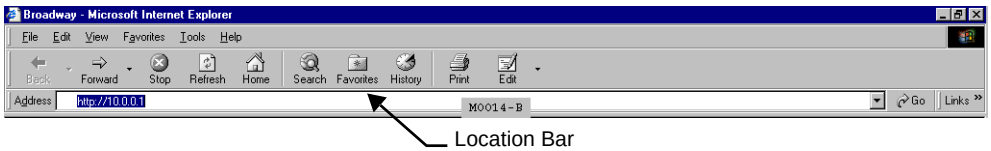
To access and view the modem Web pages, set up features for the Web browser. The Web browser must have cache settings enabled to allow the Web browser to compare its cached Web page against the modem Web page every time it is accessed, providing current information. Also, it is preferable to disable proxies. (The example below shows setup for the Internet Explorer Web browser; instructions for other Web browsers may differ slightly.)

| Step | Action |
|---|---|
| 1 | Open the Web browser. |
| 2 | On the menu bar, click **Tools \| Internet Options** to open the Internet Options dialog (Figure 2-2).<br>  <br><br>**Figure 2-2. Internet Options** |
| 3 | In the Temporary Internet Files section of the dialog, click **Settings**. |
| 4 | Select **Every visit to the page**, then click **OK**. (This sets enables cache settings.) |

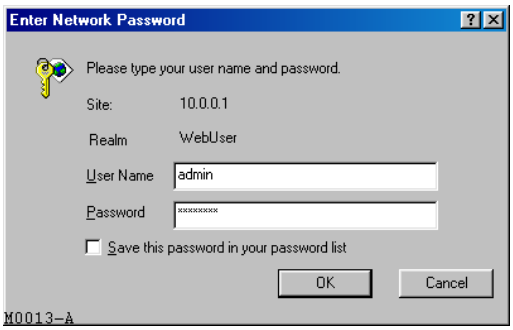
| Step | Action |
|---|---|
| 5 | Click the **Connections** tab, then click **LAN Settings** to open the LAN Settings dialog (Figure 2-3).<br>  <br>**Figure 2-3. LAN Settings** |
| 6 | In the Proxy Server section of the dialog, do one of the following:<br>• If the management PC is not connected to an intranet and is connected only to the modem, clear the **Use a proxy server** box.<br>• If the management PC is connected to the modem and also connected to an intranet (with an assigned proxy server) using a hub, do the following:<br>– Select the **Use a proxy server** box.<br>– Click **Advanced**, then add the IP address of the modem (default is 10.0.0.1) to the Exceptions field. |
| 7 | Click **OK** to close the LAN Settings dialog. |
| 8 | Click **OK** to close the Internet Options dialog. |

## ACCESSING THE MODEM WEB PAGES

Use the following steps to access the login page, enter the Web interface, and navigate the Web pages. This login is for the system administrator responsible for configuring and managing the modem.

| Step | Action |
|---|---|
| 1 | Do one of the following to access the modem Web pages:<br>• If you did not change the modem 10/100Base-T port IP address in Step 6 of the previous procedure, type **http://10.0.0.1** in the Location Bar field of the Web browser (see Figure 2-4), then press **ENTER**.<br>  <br>**Figure 2-4. Location Bar Field**<br>• If you changed the modem 10/100Base-T port IP address in Step 6 above, type **http://** and the new IP address in the Location Bar field of the Web browser, then press **ENTER**. |

| Step | Action |
|---|---|
| 2 | Enter the **User Name** and **Password**, then click **OK**. |




***Login Defaults***

| | |
|---|---|
| Username: | admin |
| Password: | password |

**Figure 2-5. Enter User Name and Password**

The System Status page is displayed and functions as a home page with a menu bar. This menu bar provides navigation to all Web pages used for configuration and management.

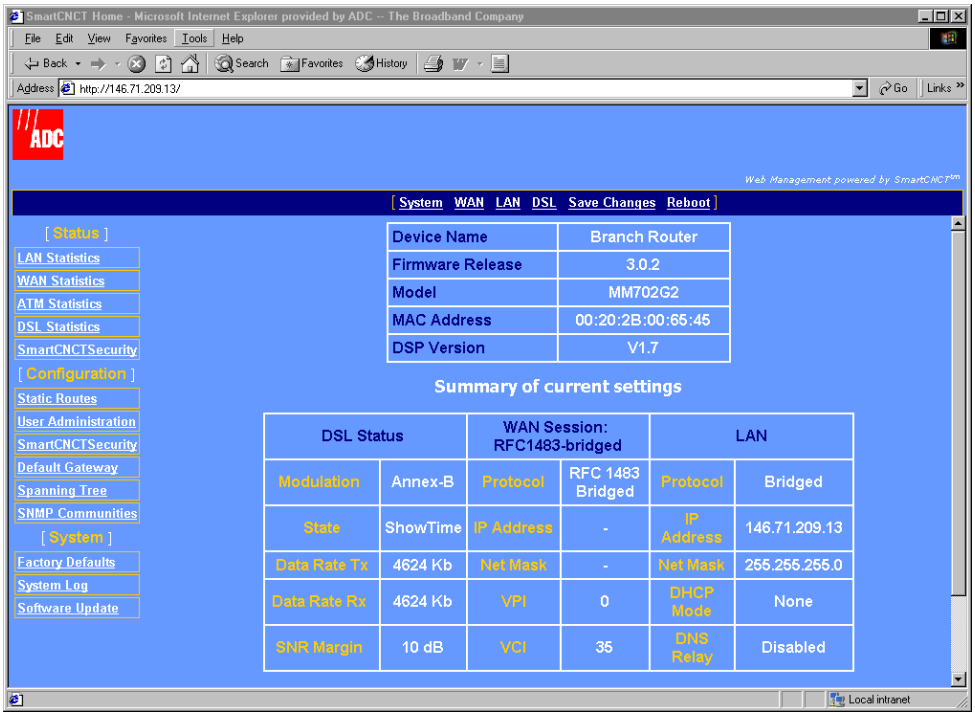



**Figure 2-6. System Status Page**

Additionally, the System Status page provides a status of the current modem configuration. See “View System Status” in Chapter 9: Managing the Modem for more information about this System Status page.

# Chapter 3

# CONFIGURING THE LAN

The LAN configuration sets up the interface between the modem 10/100Base-T LAN port and devices on the LAN. The LAN is managed by your network administrator, who will make the decisions concerning its topology.

For instructions on setting up the LAN interface for a point-to-point modem application, go to Chapter 7: Implementing a Point-To-Point LAN Extension.

## BEFORE YOU BEGIN

Your network administrator will:

- Determine if you will use the modem Ethernet port in auto, full- or half-duplex mode.
- Identify a subnet value, including IP addresses and subnet masks.
- Determine if DHCP for the modem is enabled. If it is enabled, determine if the modem will be configured as a:
  - DHCP client which receives an IP address from another device that is a DHCP server on the LAN
  - DHCP server (determine the range of IP addresses the modem will need to serve, and identify the DHCP gateway and DNS server)
  - DHCP relay agent (determine the IP address to which the DHCP functions will be relayed)
- Determine if DNS Relay mode for the modem is enabled. If it is, identify the IP address for the DNS server.

## CONFIGURE THE LAN

From the LAN Configuration page, configure the parameters for the LAN as indicated by your system administrator. The default protocol for the LAN port is *bridged*.

| Step | Action |
|---|---|
| 1 | Select **LAN** on the menu bar, then select **LAN Setup** under **LAN Options** to access the LAN Configuration page (see Figure 3-1). |

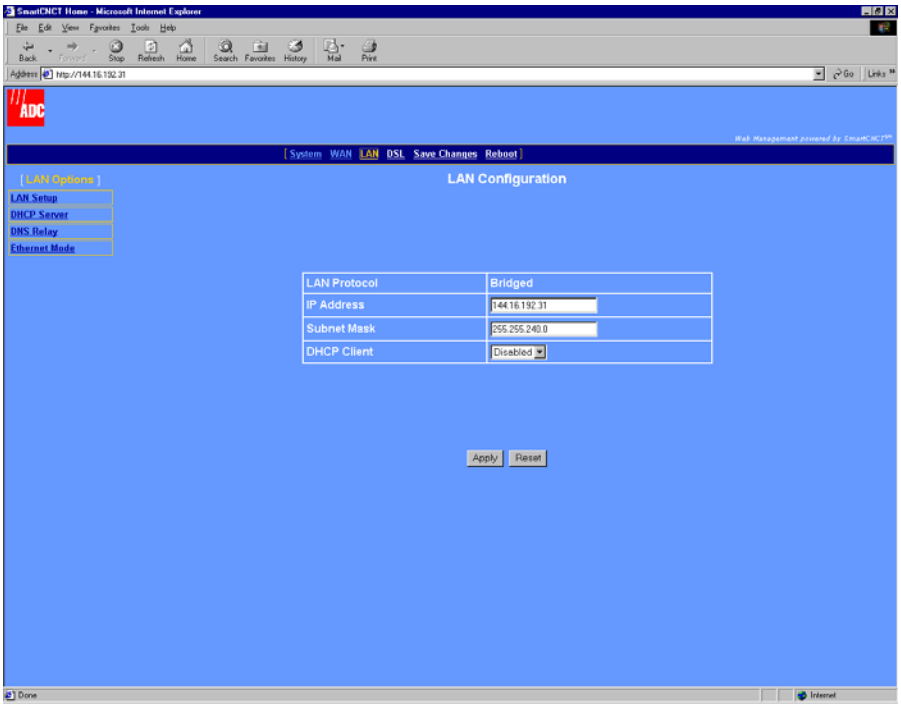



**Figure 3-1. LAN Configuration**

| Step | Action |
|---|---|
| 2 | Configure the following parameters:<br>• **LAN Protocol**<br>The LAN protocol is set to Bridged and cannot be changed through the Web interface. If you want to change the protocol to Routing, use the command line interface (go to "Set Up the LAN" on page A-6).<br>• **IP Address**<br>See the LAN administrator for a LAN IP address. Do one of the following:<br>– Enter an IP address for the LAN (10/100Base-T) port provided by the LAN administrator<br>– Use the default IP address for the LAN port, which is **10.0.0.1**. If you choose to use the default IP address, make sure the devices on your LAN are on the same subnet as this modem LAN port.<br>– If you want a DHCP server on your LAN to automatically provide the modem LAN port IP address, select **Client** for the DHCP configuration (see DHCP Client below).<br>• **Subnet Mask**<br>See the LAN administrator for the subnet mask. Do one of the following:<br>– Enter the subnet mask for the LAN (10/100Base-T) port provided by the LAN administrator.<br>– Use the default subnet mask for the LAN port, which is **255.255.255.0**. If you choose to use the default subnet mask, make sure it allows devices on your LAN to access the modem LAN port.<br>– If you want a DHCP server on your LAN to automatically provide the subnet mask in addition to the IP address, select **Client** for the DHCP configuration (see DHCP Client below).<br>• **DHCP Client**<br>**Note:** If a DHCP server is not set up and active on your LAN, do not enable DHCP client. DHCP Client mode is recommended for use only when bridging is used as the LAN protocol.<br>A DHCP server must be set up and active on the LAN prior to enabling this feature. When DHCP Client is **Enabled**, the modem automatically changes the LAN port IP address to all zeroes so that the DHCP server on the LAN can immediately serve it an IP address. This parameter is used when the LAN port is in bridging mode only. |

## CONFIGURE DNS RELAY MODE

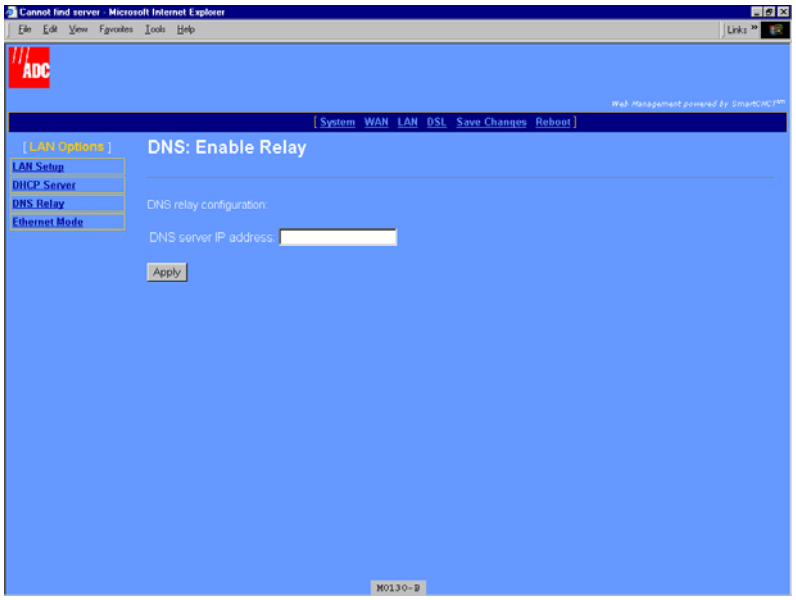
The DNS resolver on a DNS server maps human-readable addresses to IP address numbers. A human-readable address is one such as:

```
maggie.copro.company.com
```

As a DNS relay, the modem forwards requests for DNS resolution to another device on the LAN or WAN that performs the resolution service. When you enable DNS Relay mode, enter the IP address for the device that will perform DNS resolution. Either your service provider or LAN administrator will provide this IP address.

If the modem is configured as a DHCP client (see "Configure the LAN" on page 3-1), it is served a DNS address in addition to an IP address and subnet mask. The DNS relay will be automatically enabled and the DNS server IP address will be automatically displayed in the DNS server IP address field, as shown in Figure 3-3 on page 3-3.

If you do not enable DNS relay nor do you enable DHCP client, then you must add the IP address for a DNS resolver to the Internet Protocol (TCP/IP) setup for your PC (or other DHCP client). See Step 2 on page 3-5 for more information on setting up this information.

| Step | Action |
|---|---|
| 1 | Select **LAN** on the menu bar, then select **DNS Relay** under **LAN Options** to access the DNS Relay mode page (Figure 3-2).<br>  <br><br>**Figure 3-2. DNS Relay Mode Page**<br>**Note:** If DHCP Client is selected (see "Configure the LAN" on page 3-1) and a DNS server IP address assigned, then DNS: Enable Relay is automatically enabled and the DNS server IP address automatically displayed in that field. |
| 2 | Select **Enabled**, then click **Configure** to access the following DNS: Enable Relay page (Figure 3-3).<br>  <br><br>**Figure 3-3. DNS Enable Relay Page** |
| 3 | Enter the **DNS server IP address** for the device to which the modem will forward IP address resolution requests. |
| 4 | Click **Apply**. |

## CONFIGURE DHCP SERVER MODE

From the DHCP server mode page, configure the parameters for the modem to function as a DHCP server by either directly serving IP addresses (DHCP server) or forwarding the request to another device that will provide DHCP services (DHCP relay agent). If you selected **DHCP client** when you configured LAN parameters (on page 3-2), then DHCP server mode is automatically set to **Disabled**.

| Step | Action |
|---|---|
| 1 | Select **LAN** on the menu bar, then select **DHCP Server** under **LAN Options** to access the DHCP server mode page. |


**Figure 3-4. DHCP Server Mode Page**

| Step | Action |
|---|---|
| 2 | Select one of the following three DHCP server modes as indicated by your LAN administrator, then click **Configure**: |

- **Disabled—DHCP server mode** is not enabled. If you do not enable DHCP server for the modem, you must enter a default gateway for each client on your LAN (such as PCs) and also an IP address for a DNS server. Either the service provider or your LAN administrator will provide you these IP addresses to enter in the Internet Protocol (TCP/IP) setup for your PC (or other LAN clients). See "Assign IP Addresses" on page 2-1 for information about how to access this dialog. The following is an example of the dialog and fields that must be filled in (example is from Windows 2000; the dialog for other operating systems may be slightly different).

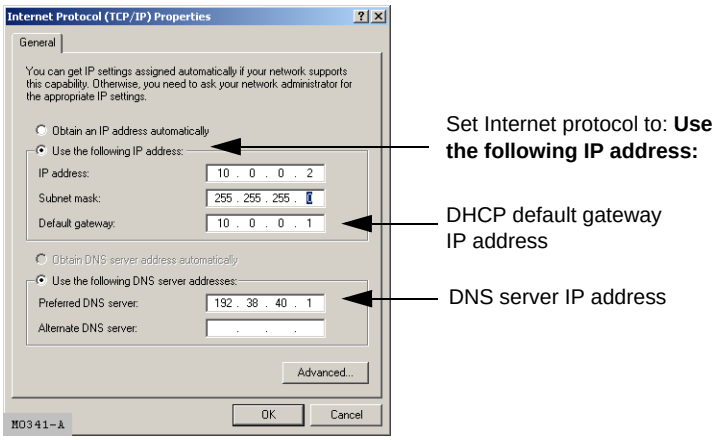
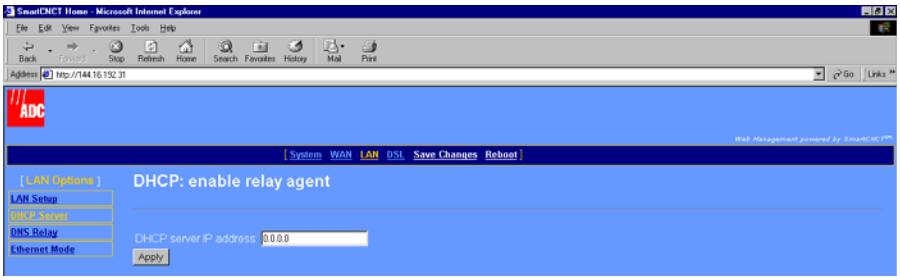



**Figure 3-5. Internet Protocol (TCP/IP) Properties**

- **Enabled**—The modem functions as a DHCP server and can serve IP addresses, a DHCP gateway, and a DNS server IP address to devices on your LAN. When the modem DHCP server is enabled, then LAN clients (such as PCs) must have their Internet protocol (TCP/IP) set to **Obtain an IP address automatically** (see Figure 3-5 above for an example of where to select this option).

  a. Select **Enabled**, then click **Configure** to access the following DHCP Server page (DHCP Server cannot be enabled when the LAN protocol is in bridge mode).


**Figure 3-6. DHCP Server Page**

| Step | Action |
|---|---|
| 2 (cont.) | b. Configure the following parameters when DHCP server is enabled for the modem:<br>– **DHCP Range Low**<br>The lowest IP address value that the modem can serve when configured as a DHCP Server. A maximum of 20 IP addresses can be served by the modem. This IP address value is provided by your LAN administrator and must be on the same subnet as the modem LAN port.<br>– **DHCP Range High**<br>The highest IP address value that the modem can serve when configured as a DHCP Server. A maximum of 20 IP addresses can be served by the modem. This IP address value is provided by your LAN administrator and must be on the same subnet as the modem LAN port.<br>– **Default Lease Time**<br>The default amount of time, in seconds, that a device on the LAN can be bound to the IP address it was served before the lease expires. This value is provided by your LAN administrator.<br>– **Max Lease Time**<br>The maximum amount of time, in seconds, that a device on the LAN can be bound to the IP address it was served before the lease expires. This value is provided by your LAN administrator.<br>– **DHCP Default Gateway**<br>Enter the IP address of the DHCP default gateway that is provided by the LAN administrator for devices on the LAN. After you configure this IP address, the modem provides this IP address as a default DHCP gateway to requesting DHCP clients (such as PCs) on the LAN. If there are no gateways on the LAN, then the modem LAN port IP address can be assigned as the gateway.<br>– **DHCP DNS Server**<br>Enter the IP address of the Domain Name System (DNS) server that will translate human-readable addresses to IP addresses. The DNS server can be either on the LAN or the WAN side of the modem. The modem provides this IP address as a default DNS server to requesting DHCP clients (such as PCs) on the LAN. If the DNS server is on the LAN side of the modem, acquire the IP address from your LAN administrator. If the DNS server is on the WAN side of the server, acquire the IP address from the service provider.<br>If you enabled DNS relay on page 3-3 and entered a DNS server IP address, then enter the modem LAN port IP address as the DHCP DNS server.<br>• **DHCP relay agent**—The modem forwards the request for an IP address, DHCP default gateway, and DNS server IP address to a device acting as a DHCP server. The DHCP server can be either on the LAN or the WAN side of the modem. If on the LAN side, acquire the IP address from your LAN administrator. If on the WAN side, acquire the IP address from the service provider.<br>a. Select **DHCP relay agent**, then click **Configure** to access the following DHCP Server page.<br>  <br>**Figure 3-7. DHCP Server Page**<br>b. Enter the **DHCP Server IP address** for the device to which the modem will forward DHCP services requests, then click **Apply**. |

# Chapter 4

# CONFIGURING THE WAN

The WAN configuration sets up from 1 to 32 sessions between the modem and the service provider or between two G.shdsl modems (see Chapter 7: Implementing a Point-To-Point LAN Extension for more information). Each session can be configured separately, specifying the protocol, IP address, ATM connection identifier, ATM QoS, and more.

## BEFORE YOU BEGIN

The following should be supplied by the service provider before configuring WAN sessions:

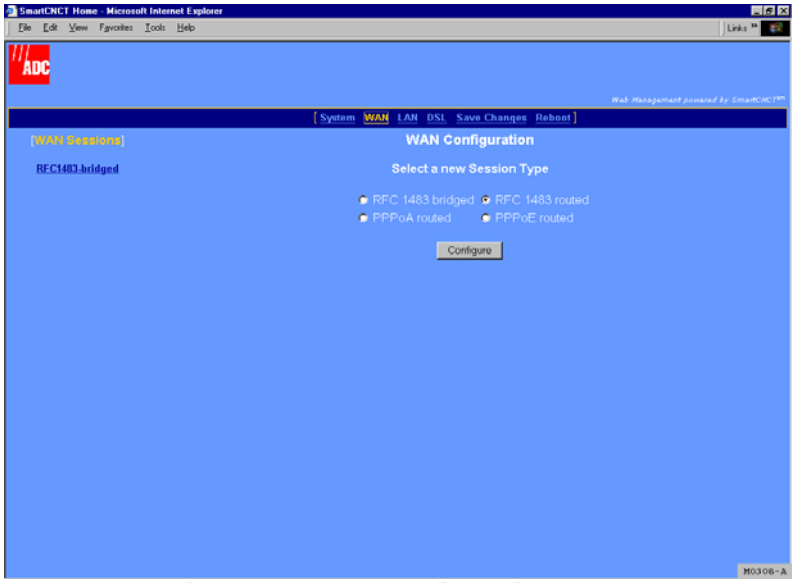
- Protocol for each session, where the choices are the following for a maximum of 32:
  - RFC 1483-Bridge (up to 8 sessions)
  - RFC 1483-Router (up to 16 sessions)
  - PPPoA or PPPoE (up to 8 sessions for either type)
- IP address and subnet mask for each session using RFC 1483-Router protocol.
- RIP version (each direction) for each session using RFC 1483-Router protocol or PPP:
  - RIP Version1
  - RIP Version 2
  - RIP Version 1 and RIP Version 2
- Encapsulation for 1483-Bridge or 1483-Router, where the choices are:
  - LLC
  - VCMux
- Login and authentication for each session using PPP protocol, where the choices are:
  - login name and password
  - authentication type of either PAP, CHAP or None
- ATM parameters for each session, including:
  - VPI and VCI values
  - Quality of Service (QoS) which could be UBR or CBR and applicable cell rates

**Note:** The modem is shipped with factory defaults as a Remote modem.

With V3.2.0, there are two RFC-1483 WAN Bridging sessions with PVC's 0/35 and 0/100. For point-to-point LAN extension applications, delete one WAN session.

## CONFIGURE A NEW WAN SESSION

You can configure up to 32 total PPPoA, PPPoE, 1483-Bridge, and 1483-Router sessions for the modem. See page 25 for the maximum number of sessions per each protocol type that can be set up. A default bridging session is set up. From the WAN configuration page (Figure 4-1), define the parameters for each session.

| Step | Action |
|---|---|
| 1 | Select WAN on the menu bar to access the WAN Configuration page.<br>  <br><br>**Figure 4-1. WAN Configuration Page** |
| 2 | To add a new session, choose one of the following protocols from **Select a new session type**.<br>• **RFC 1483** bridged if the modem forwards packets based on MAC addresses. You can enable Spanning Tree when you select Bridge sessions. See "Change Spanning Tree Setting" on page 5-10.<br>• **RFC 1483** routed if the modem routes packets based on IP addresses.<br>• **PPPoA** routed if the modem establishes PPP sessions over ATM with the service provider and routes packets based on IP addresses.<br>• **PPPoE** routed if modem establishes PPP sessions over Ethernet with the service provider and routes packets based on IP addresses. |
| 3 | Click **Configure** to access the session page for the protocol type you selected. |
| 4 | Go to the appropriate section that follows for the protocol that you selected. |

F4 and F5 OAM are enabled on default PVCs (0/35 and 0/100) and on every new PVC that is created.

## Set Up an RFC 1483 Bridged Session

When you select RFC 1483 bridged from the WAN Configuration page you see the following page (Figure 4-2).

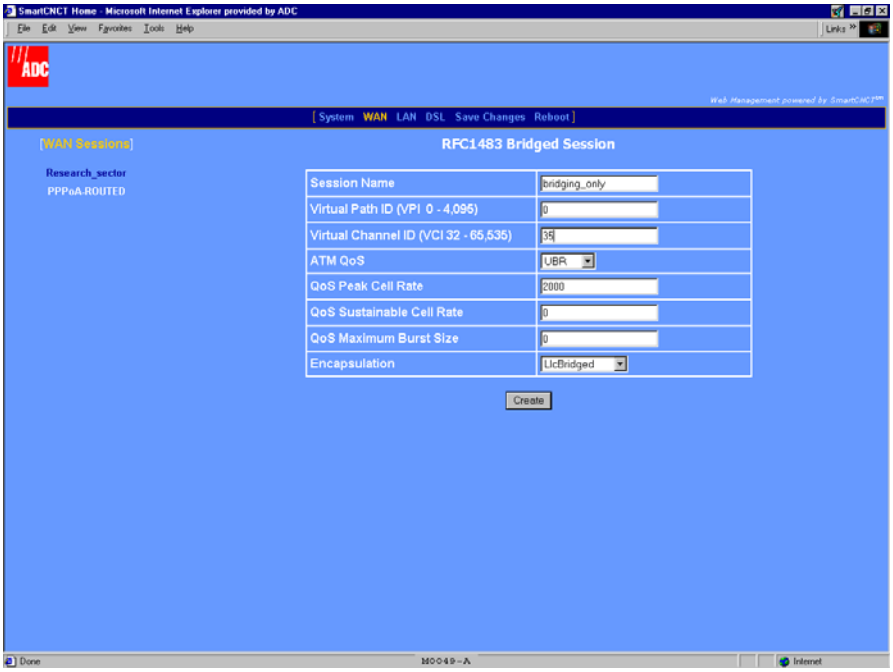



**Figure 4-2. RFC 1483 Bridged Session**

| Step | Action |
|---|---|
| 1 | Configure the following parameters for each session:<br>• **Session Name**<br>Enter a unique, descriptive identifier for the session. This name can have a maximum of 32 characters.<br>• **Virtual Path ID (VPI)**<br>Enter the value (from 0 to 4,095) provided by the service provider. The number identifies the virtual path that transports ATM cells between the modem and the service provider. This value must match the virtual path identification (VPI) value the service provider uses for this connection.<br>• **Virtual Channel ID (VCI)**<br>Enter the value (from 32 to 65,535) provided by the service provider. The number identifies the virtual channel for this session that transports ATM cells between the modem and the service provider. This value must match the virtual channel identification (VCI) value the service provider uses for this connection.<br>• **ATM QoS**<br>Select the ATM Quality of Service indicated by your service provider. The options are:<br>– UBR (unspecified bit rate is the default setting)<br>– CBR (constant bit rate)<br>– VBR-rt (variable bit rate real-time)<br>– VBR-nrt (variable bit rate non-real-time)<br>• **QoS Peak Cell Rate**<br>Enter the QoS Peak Cell Rate (PCR) value supplied by your service provider. If you are not provided a PCR value, use the default. PCR is the maximum rate at which data is transferred on the line and measured in ATM cells per second. The valid range is 1-5500 cells per second for Single Pair Mode and 1-11000 for Dual Pair Mode. The default PCR is 5500.<br>• **QoS Sustainable Cell Rate**<br>Enter the QoS Sustainable Cell Rate (SCR) value supplied by your service provider. Use for VBR-rt, and VBR-nrt ATM QoS. SCR is the average rate at which ATM cells are transferred, measured in cells per second. The SCR must be less than the PCR. The valid range is 1-5500 cells per second.<br>• **QoS Maximum Burst Size**<br>Enter the QoS Maximum Burst Size (MBS) value supplied by your service provider. Use with VBR-rt and VBR-nrt QoS. MBS is the maximum number of cells that can be transmitted at the peak cell rate. The MBS rate must be equal to or less than the PCR. The default MBS is 0.<br>• **Encapsulation**<br>Select the encapsulation type as indicated by the service provider. The options are:<br>– **LlcBridged**—Logical Link Control allows multiple protocols to be run over the session. This is the default encapsulation.<br>– **VcMuxBridged**—Virtual Channel Multiplexer-based encapsulation allows one protocol to be run over the session. |
| 2 | Click **Create** to add the new RFC1483-Bridge session to your session list on the WAN Configuration page. |

## Set Up an RFC 1483 Routed Session

When you select RFC 1483 routed from the WAN Configuration page you see the following page (Figure 4-3).

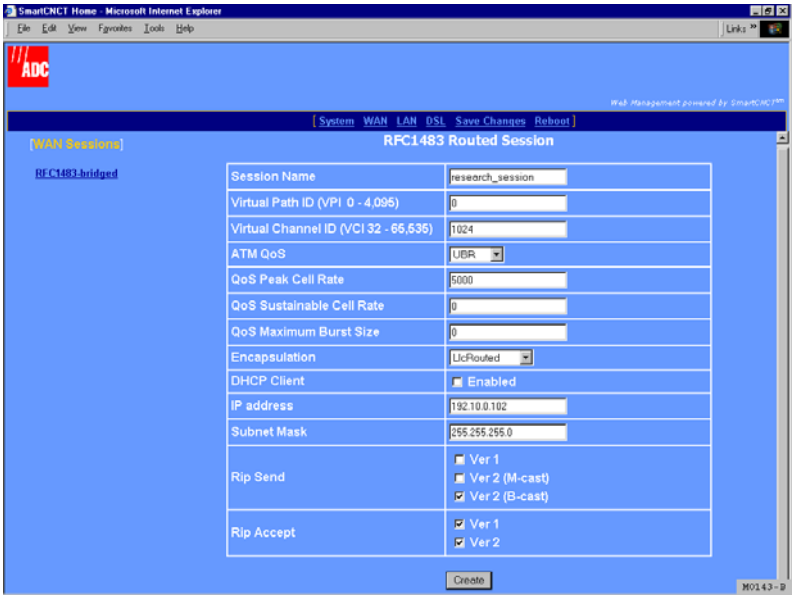



**Figure 4-3. RFC 1483 Routed Session**

| Step | Action |
|---|---|
| 1 | Configure the following parameters for each session:<br>• **Session Name**<br>Enter a unique, descriptive identifier for the session. This name can have a maximum of 32 characters.<br>• **Virtual Path ID (VPI)**<br>Enter the value (from 0 to 4,095) provided by the service provider. The number identifies the virtual path that transports ATM cells between the modem and the service provider. This value must match the virtual path identification (VPI) value the service provider uses for this connection.<br>• **Virtual Channel ID (VCI)**<br>Enter the value (from 32 to 65,535) provided by the service provider. The number identifies the virtual channel for this session that transports ATM cells between the modem and the service provider. This value must match the virtual channel identification (VCI) value the service provider uses for this connection.<br>• **ATM QoS**<br>Select the ATM Quality of Service indicated by your service provider. The options are:<br>– UBR (unspecified bit rate is the default setting)<br>– CBR (constant bit rate)<br>– VBR-rt (variable bit rate real-time)<br>– VBR-nrt (variable bit rate non-real-time)<br>• **QoS Peak Cell Rate**<br>Enter the QoS Peak Cell Rate (PCR) value supplied by your service provider. If you are not provided a PCR value, use the default. PCR is the maximum rate at which data is transferred on the line and measured in ATM cells per second. The valid range is 1-5500 cells per second. The default PCR is 5500.<br>• **QoS Sustainable Cell Rate**<br>Enter the QoS Sustainable Cell Rate (SCR) value supplied by your service provider. Use for VBR-rt, and VBR-nrt ATM QoS. SCR is the average rate at which ATM cells are transferred, measured in cells per second. The SCR must be less than the PCR. The valid range is 1-5500 cells per second.<br>• **QoS Maximum Burst Size**<br>Enter the QoS Maximum Burst Size (MBS) value supplied by your service provider. Use with VBR-rt and VBR-nrt QoS. MBS is the maximum number of cells that can be transmitted at the peak cell rate. The MBS rate must be equal to or less than the PCR. The default MBS is 0.<br>• **Encapsulation**<br>Select the encapsulation type as indicated by the service provider. The options are:<br>– **LlcRouted**—Logical Link Control allows multiple protocols to be run over the session. This is the default encapsulation.<br>– **VcMuxRouted**—Virtual Channel Multiplexer-based encapsulation allows one protocol to be run over the session.<br>• **DHCP Client**<br>Select to enable DHCP client where this session will automatically received an IP address from the service provider via a DHCP server. If you select DHCP Client, leave the next two fields, IP address and Subnet Mask, blank. These fields will automatically receive values. |

| Step | Action |
|---|---|
| 1 (cont.) | • **IP Address**<br>Enter the IP address provided by the service provider for this session. Or if DHCP Client was selected, the IP address will automatically be assigned by a DHCP server on the WAN side of the network. The default IP address is 0.0.0.0.<br>• **Subnet Mask**<br>Enter the subnet mask provided by the service provider for this session or use the default subnet mask for the session which is 255.0.0.0. Or if DHCP Client was selected, the subnet mask will automatically be assigned by a DHCP server on the WAN side of the network.<br>• **RIP Send**<br>This session forwards RIP version 1 (Ver 1), RIP version 2 multicast (Ver2 (M-cast)), RIP version 2 broadcast (Ver2 (B-cast)), or all versions of RIP packets. Select the RIP version or versions the modem will send on this session. The default is Ver2 (B-cast).<br>• **RIP Accept**<br>This session receives RIP version 1 (Ver 1) only, RIP version 2 (Ver 2) only, or both versions of RIP packets. Select the RIP version or versions the modem will receive for this session. The default is RIP Ver 1 and Ver 2. |
| 2 | Click **Create** to add the new RFC1483-Router session to your session list on the WAN Configuration page. |

## Set Up a PPPoA or PPPoE Routed Session

Selecting either PPPoA routed or PPPoE routed from the WAN Configuration page displays the following page (Figure 4-4). The PPPoA routed configuration page is shown below as an example. The configuration parameters for PPPoE routed are identical.

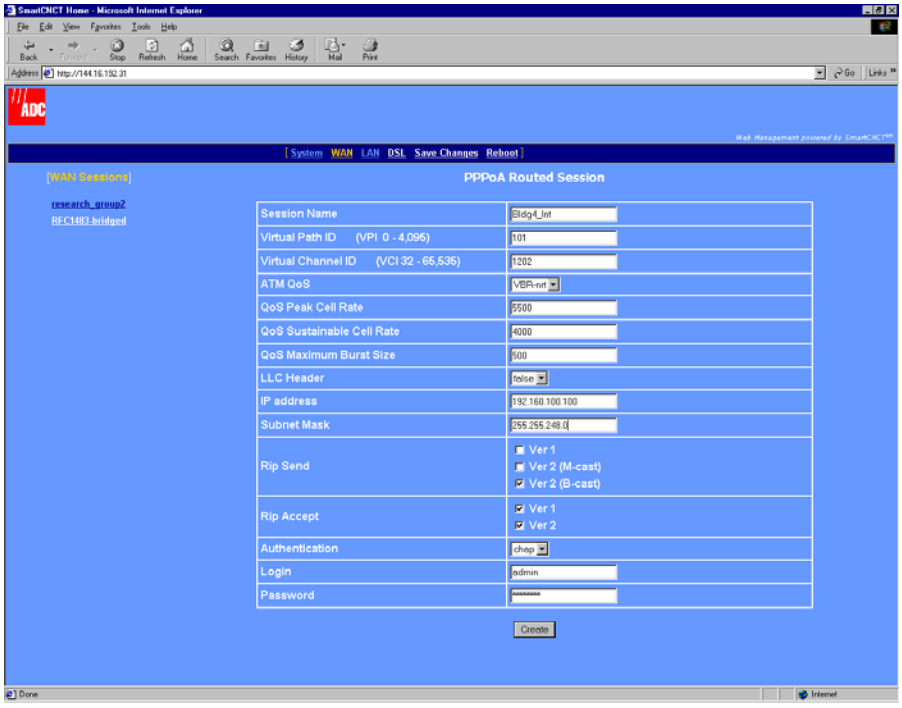



**Figure 4-4. PPPoA Routed Session**

| Step | Action |
|---|---|
| 1 | Configure the following parameters for each session:<br>• **Session Name**<br>Enter a unique, descriptive identifier for the session. This name can have a maximum of 32 characters.<br>• **Virtual Path ID (VPI)**<br>Enter the value (from 0 to 4,095) provided by the service provider. The number identifies the virtual path that transports ATM cells between the modem and the service provider. This value must match the virtual path identification (VPI) value the service provider uses for this connection.<br>• **Virtual Channel ID (VCI)**<br>Enter the value (from 32 to 65,535) provided by the service provider. The number identifies the virtual channel for this session that transports ATM cells between the modem and the service provider. This value must match the virtual channel identification (VCI) value the service provider uses for this connection.<br>• **ATM QoS**<br>Select the ATM Quality of Service indicated by your service provider. The options are:<br>– **UBR** (unspecified bit rate is the default setting)<br>– **CBR** (constant bit rate)<br>– **VBR-rt** (variable bit rate real-time)<br>– **VBR-nrt** (variable bit rate non-real-time)<br>• **QoS Peak Cell Rate**<br>Enter the QoS Peak Cell Rate (PCR) value supplied by your service provider. If you are not provided a PCR value, use the default. PCR is the maximum rate at which data is transferred on the line and measured in ATM cells per second. The valid range is 1-5500 cells per second. The default PCR is 5500.<br>• **QoS Sustainable Cell Rate**<br>Enter the QoS Sustainable Cell Rate (SCR) value supplied by your service provider. Use for VBR-rt, and VBR-nrt ATM QoS. SCR is the average rate at which ATM cells are transferred, measured in cells per second. The SCR must be less than the PCR. The valid range is 1-5500 cells per second.<br>• **QoS Maximum Burst Size**<br>Enter the QoS Maximum Burst Size (MBS) value supplied by your service provider. Use with VBR-rt and VBR-nrt QoS. MBS is the maximum number of cells that can be transmitted at the peak cell rate. The MBS rate must be equal to or less than the PCR. The default MBS is 0.<br>• **LLC Header**<br>Select either true or false for the LLC header. The default is false. False indicates that VCMux encapsulation is used. True indicates that LLC/Snap encapsulation is used.<br>• **IP Address**<br>The IP address is dynamically served by the service provider for this session. When the modem has received the IP address for this session, it displays the value in this field. Also, the IP address dynamically received for the first PPP session set up is assigned as the default gateway (see “Add a Default Gateway” on page 5-4).<br>If the service provider does not dynamically provide an IP address, they can give you a static IP address that you can enter in this field. |

| Step | Action |
|---|---|
| 1 (cont.) | • **RIP Send**<br>This session forwards RIP version 1 (Ver 1), RIP version 2 multicast (Ver2 (M-cast)), RIP version 2 broadcast (Ver2 (B-cast)), or all versions of RIP packets. Select the RIP version or versions the modem will send on this session. The default is Ver2 (B-cast).<br>• **RIP Accept**<br>This session receives RIP version 1 (Ver 1) only, RIP version 2 (Ver 2) only, or both versions of RIP packets. Select the RIP version or versions the modem will receive for this session. The default is RIP Ver 1 and Ver 2.<br>• **Authentication**<br>Select the authentication protocol provided by your service provider for PPP sessions. The authentication protocol type must match at the modem and the service provider. The options are:<br>– **PAP**—The modem sends authentication requests to the service provider and authentication occurs only once during the life of the DSL link.<br>– **CHAP**—The service provider returns an authentication challenge to the modem during the authentication (default setting).<br>– **NONE**—No authentication is required for the session.<br>• **Login**<br>Change the default login name (admin) for this PPP session to the Login name supplied by the service provider. Minimum login name length is one character and the maximum is 32 characters.<br>• **Password**<br>Change the default login password (password) for this PPP session to the Login password supplied by the service provider. Minimum password length is six characters and the maximum is 32 characters. |
| 2 | Click **Create** to add the new PPPoA or PPPoE session to your session list on the WAN Configuration page. |

### Permanently Save Sessions

After you have set up all the WAN sessions, save these changes permanently, as described in “Saving Changes” on page 5-12.

## EDIT A WAN SESSION

You can change parameters for any of the 32 PPPoA, PPPoE, 1483-Bridge, and 1483-Router sessions for the modem. See page 4-1 for the limits on sessions per each protocol type. From the WAN configuration page, configure the parameters for each session you will set up.

| Step | Action |
|---|---|
| 1 | Select **WAN** on the menu bar to access the WAN Configuration page (see Figure 4-5). |

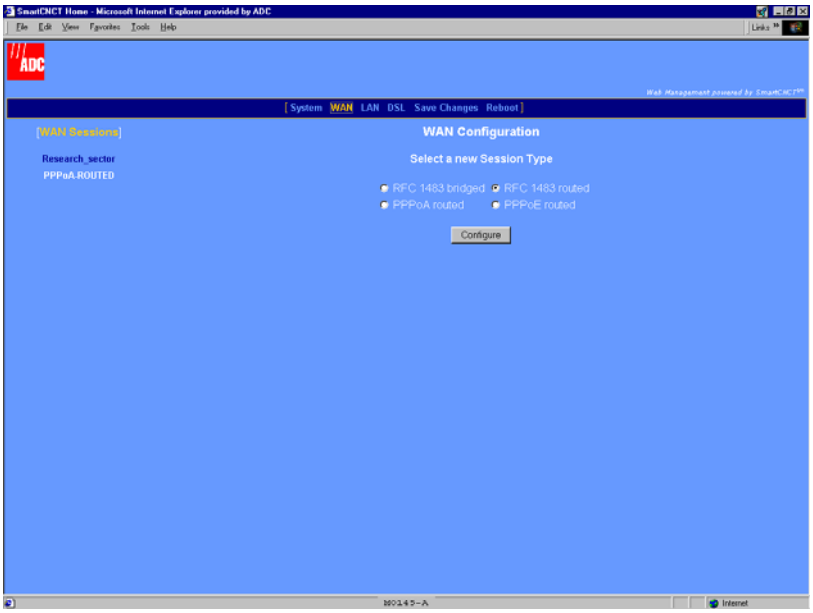
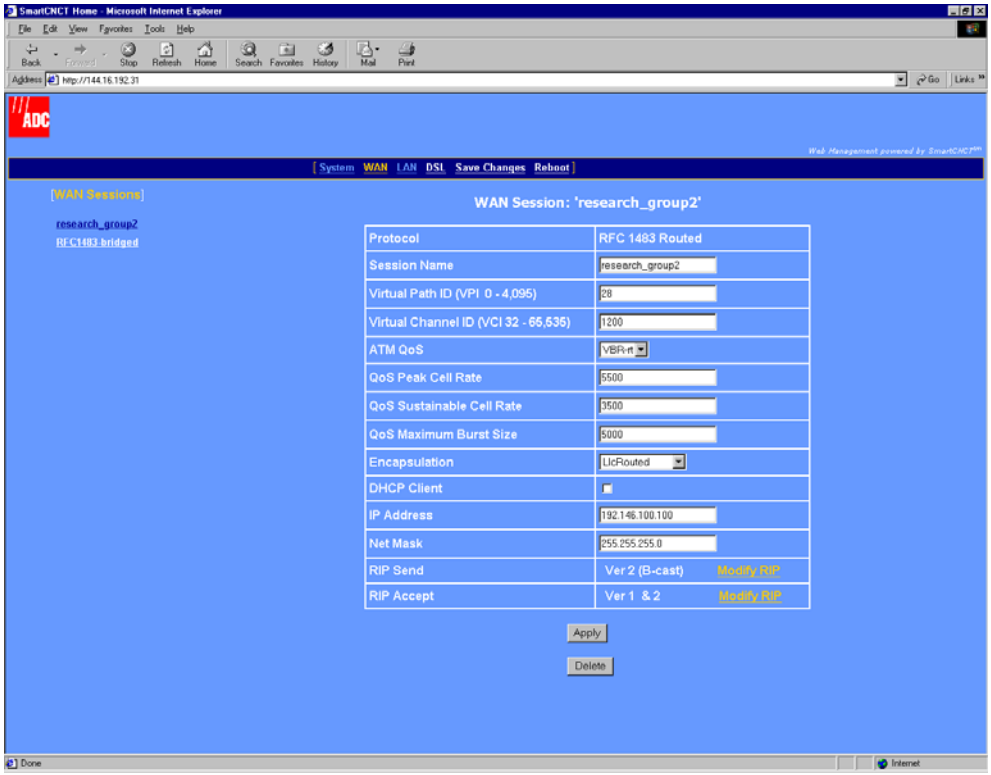



**Figure 4-5. WAN Configuration**

| Step | Action |
|---|---|
| 2 | Select a session from the WAN Sessions list. The configuration options for that WAN session are displayed.<br>The following (Figure 4-6) shows the fields you can edit for a routing session or you can delete the session. The **Protocol** field at the top of the dialog is read-only. It indicates the protocol that you previously selected for this session.<br>  <br>**Figure 4-6. WAN Sessions (Routing)** |

| Step | Action |
|---|---|
| 2 (cont.) | The following (Figure 4-7) shows the fields you can edit for a PPP session or you can delete the session. The **Protocol** field at the top of the dialog is read-only. It indicates the protocol that you previously selected for this session. |
| 3 | Change session parameters as required. Go to the following pages for parameter definitions based on the protocol used for that session:<br>• For an RFC1483-Bridge session, go to page 4-3.<br>• For an RFC1483-Routed session, go to page 4-5.<br>• For a PPPoA Routed session, go to page 4-7.<br>• For a PPPoE Routed session, go to page 4-7. |
| 4 | Do one of the following:<br>• Click **Apply**, then save changes as described in "Saving Changes" on page 5-12.<br>• Click **Delete** to entirely remove the session, then save changes as described in "Saving Changes" on page 5-12. |

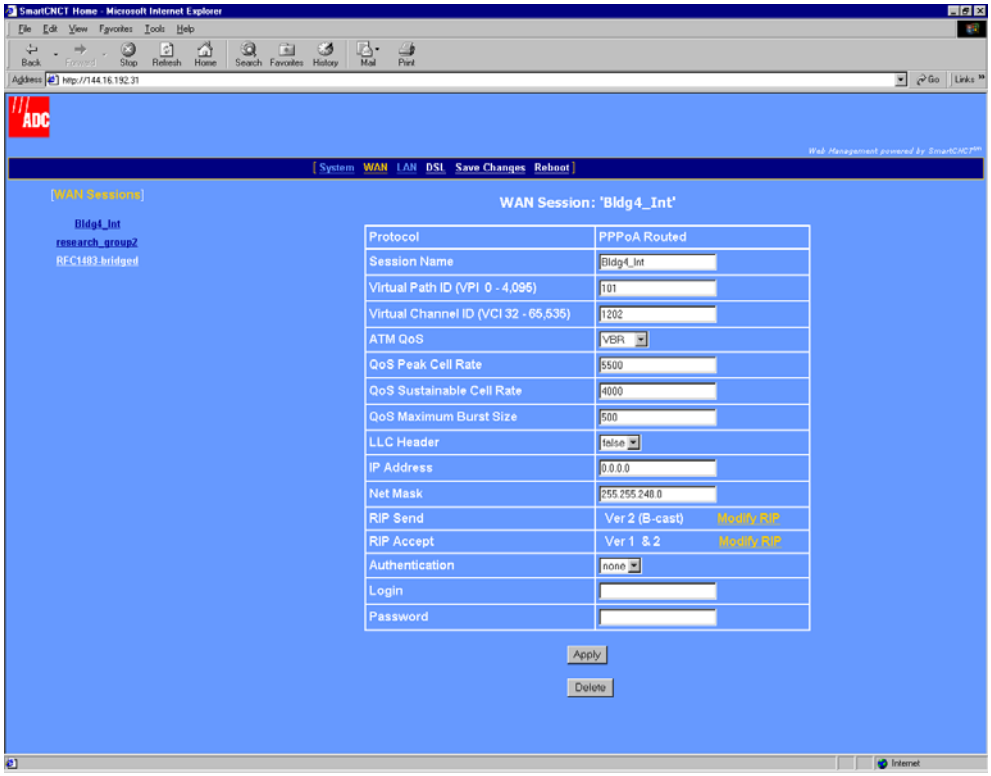



**Figure 4-7. WAN Sessions (PPP)**

# Chapter 5

# CONFIGURING SYSTEM PARAMETERS

These configuration parameters affect system functions for the modem. Other system parameters used to manage or troubleshoot the modem (updating modem software, for example) are in “Managing the Modem” on page 9-1.

## Before You Begin

Determine the following before changing system parameters:

- If secured management access is required for the modem, add users and assign one of three predefined security levels: Default, Engineer, or Super User.
- If SNMP access to the modem is required, add SNMP communities with either read or write access.
- Add the IP address for the network default router through which packets are forwarded.
- If static routes will be used to predetermined destinations, identify the destination host or network IP address. Also, identify the next hop gateway IP address for devices on your LAN (for example, the modem LAN port IP address).
- If spanning tree protocol is required, based on one or both of the following conditions, then enable it:
  - RFC 1483-Bridge protocol is used for any session or for the 10/100Base-T port (LAN)
  - there are multiple bridging devices on a LAN with more than one physical path connecting them and you want to prevent loops

  Otherwise, disable spanning tree protocol.

## Assigning User Access

The modem provides secure access for managing and viewing modem configuration. Three levels of access are predefined and can be assigned to users you set up. These security logons are required for access to the Web interface or to access the command line interface through either the console port or through a telnet session. For the three levels of predefined access, it is recommended that you change the passwords for all three accesses to secure the modem for management. The following procedures show how to add, modify, or delete user accounts.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **User Administration** under **Configuration** to access the Users’ List page (Figure 5-1). |

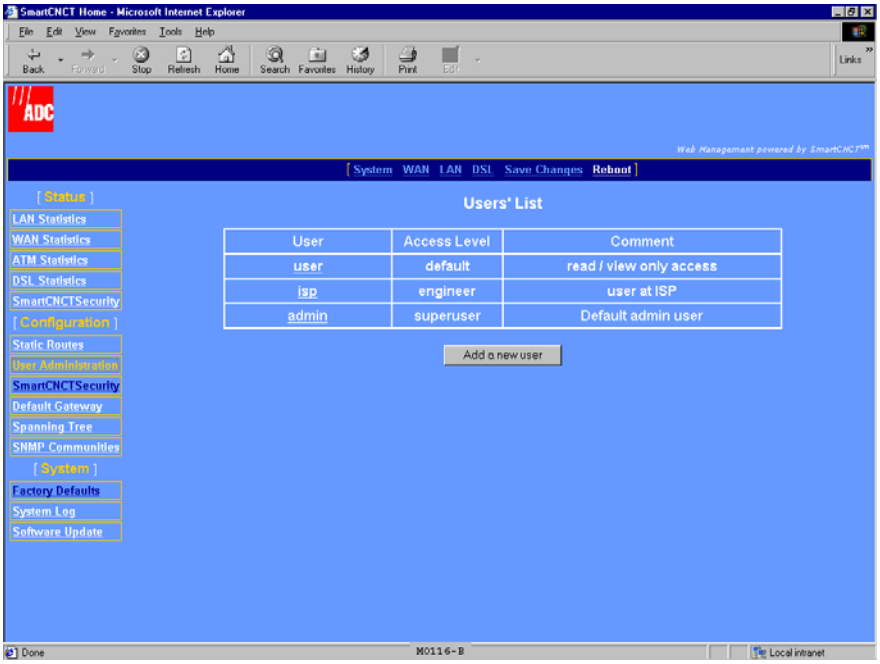



**Figure 5-1. Users’ List**

| Step | Action |
|---|---|
| 2 | To add a new user account, do the following:<br>a. Click **Add a new user**. The following dialog is displayed (Figure 5-2). |

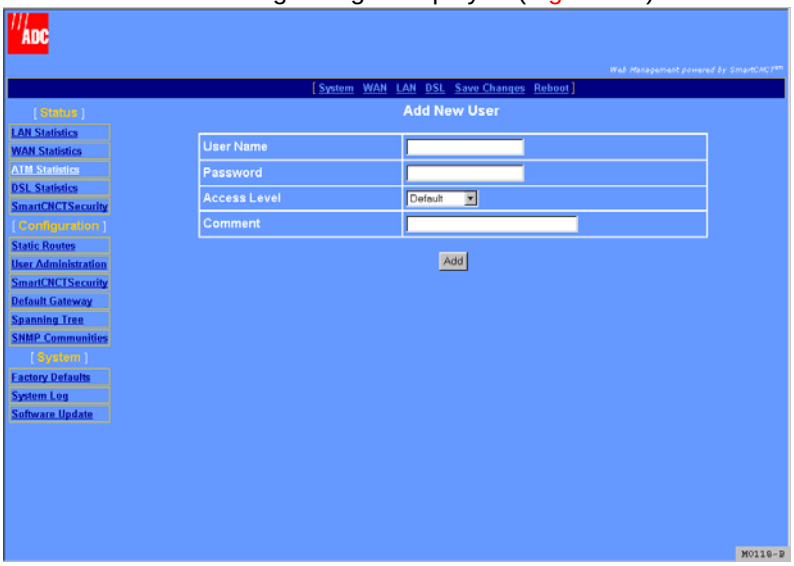



**Figure 5-2. Add New User**

**Note:** It is important to change the password for all three default user accounts to ensure secure access to the modem for configuration and management.

b. Enter the following information:

– **User Name**

The login name for this user. The login name can be a maximum of 32 characters and all keyboard characters, except a space, are allowed.

– **Password**

The password associated with this user login. The password must be a minimum of six and a maximum of 32 alphanumeric characters (including caps and lowercase).

– **Access Level**

The level of access to modem configuration and management allowed for this user. Choose from the following list of access levels:

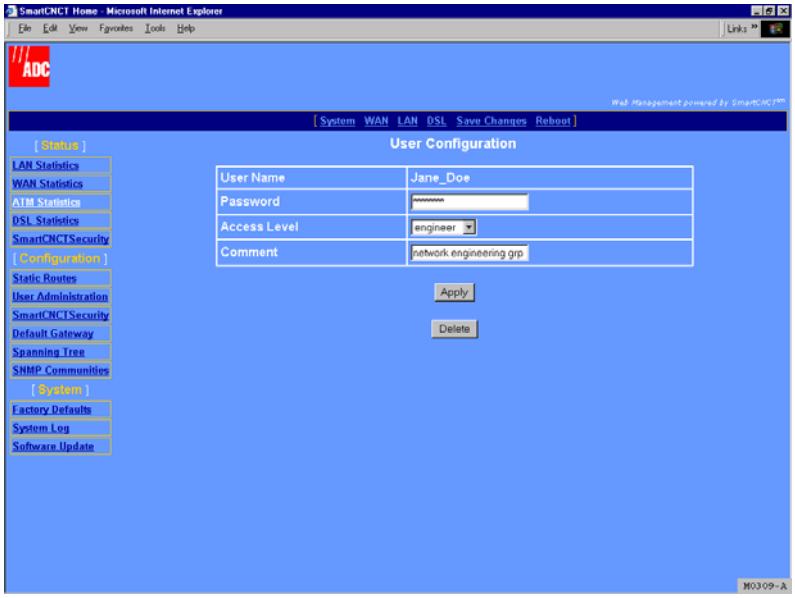
| *Defaults* | |
|---|---|
| **User Name:** | admin |
| **Password:** | password |
| **Access level:** | superuser |
| **User Name:** | isp |
| **Password:** | password |
| **Access level:** | engineer |
| **User Name:** | user |
| **Password:** | password |
| **Access level:** | default |

**Table 5-1. User Access Levels**

| Access Level | Definition |
|---|---|
| Super User | This user has full administrative access to the modem. This includes full view and write access to all modem configuration and management. |
| Engineer | This user has write access to all LAN-side and DSL configuration (including DSL testing) only. All other configuration access (WAN session and System) is view only. |
| Default | This user has view only access to all modem configuration and management. Default is the default access level when setting up new user accounts. |

– **Comment**

Identifies the user in a way that is meaningful to you. All keyboard characters are allowed.

| Step | Action |
|---|---|
| 2 (cont.) | c. Click **Add**. The new entry is now viewable from the Users' List table (see Figure 5-1 on page 5-1). |
| 3 | To modify or delete an existing user entry, do the following:<br><br>**Note:** It is important to change the default password for all three default user accounts to ensure secure access to modem for configuration and management.<br><br>a. From the Users' List table (see Figure 5-1 on page 5-1), select the name in the User column that you want to change or delete. The following dialog is displayed.<br><br>  <br><br>**Figure 5-3. User Configuration**<br><br>b. To modify the user account, change any of the parameters. Click **Apply**.<br>c. To delete the user account, click **Delete**. The user account is immediately removed from the Users' List table. |

## ADD A DEFAULT GATEWAY

The modem default gateway is a IP address through which packets are routed to the internet if the next hop IP address cannot be identified by the modem. Use the IP address of a router on the LAN or WAN end. If the network does not have gateways, use the default value (0.0.0.0).

When setting the modem default gateway, if the first session you set up was a PPP session, the IP address that was dynamically assigned to that PPP session was also automatically assigned as the default gateway. If you do not want this IP address (PPP WAN session) as the default gateway, then use this page to change it to another value.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **Default Gateway** under **Configuration** to access the Default Gateway page (Figure 5-4). |
| 2 | To add a default gateway, enter the IP address for the gateway through which the modem will forward packets. Click **Apply**. |
| 3 | To remove the default gateway IP address, click **Delete**. |

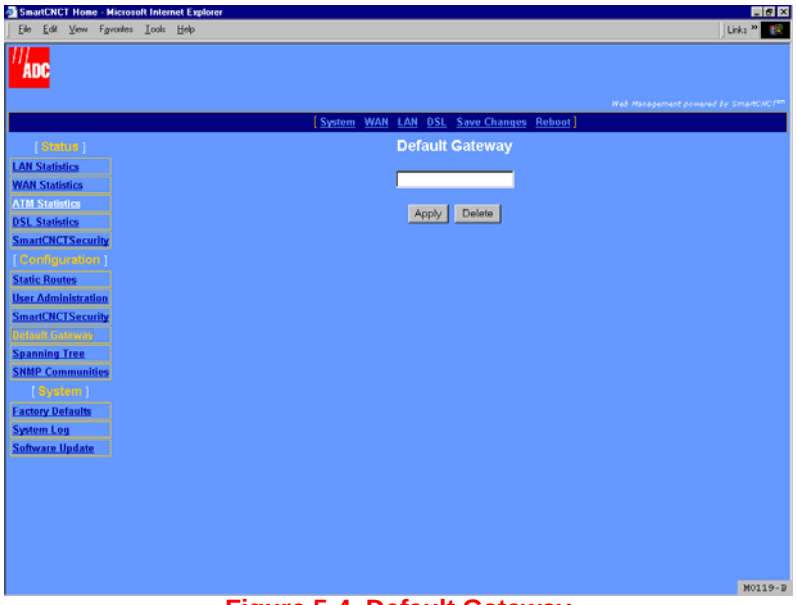



**Figure 5-4. Default Gateway**

## ADD STATIC ROUTE ENTRIES

A static route provides a defined path from one host or network to a destination host or network. This type of route is manually entered as a fixed path, as contrasted to a dynamic route which is automatically determined and learned (RIP, for example). If the next gateway for network traffic is unknown, a static route will be its default path. Adding a system default gateway creates a default static route entry in the Static Routes table.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **Static Routes** under **Configuration** to access the Static Routes page. |


**Figure 5-5. Static Routes**

| Step | Action |
|---|---|
| 2 | To add a new static route, do the following:<br>a. On the Static Routes page, click **Create a new IP route**. The following dialog is displayed. |

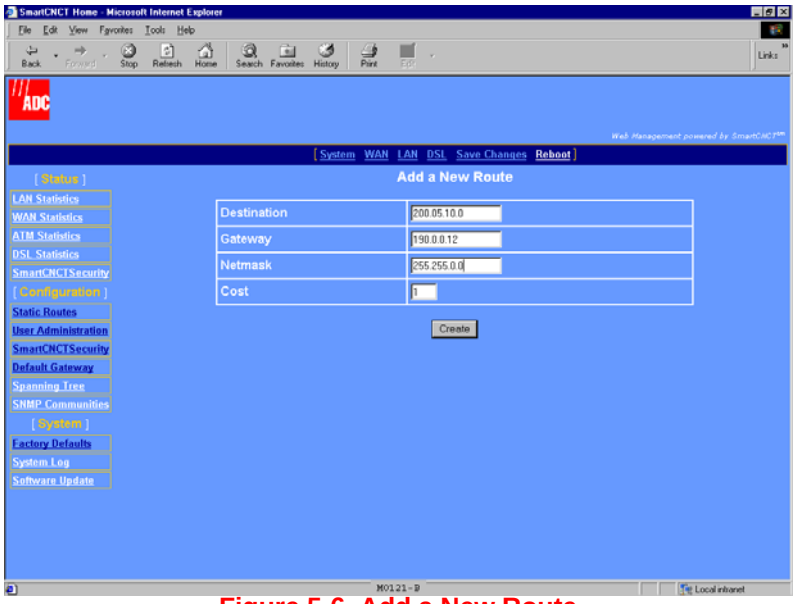



**Figure 5-6. Add a New Route**

b. Enter the following information for the static route.

- **Destination**

  The IP address for the destination network, subnet, or host to which the packets are directed. Use 0.0.0.0 as the destination IP address for a default route.
- **Gateway**

  The IP address for the next hop in your network to which the packets are forwarded. The gateway can be present either on the LAN or the WAN.
- **Netmask**

  The network mask defining the route and access for the destination IP address.
- **Cost**

  The number of hops (gateways) from 1 to 15 through which this traffic can pass before reaching its destination.

c. Click **Create**. The new entry is added to and is displayed in the Static Routes table (see page 5-5).

| Step | Action |
|---|---|
| 3 | To delete a static route entry, do the following:<br>a. From the Static Routes table (page 5-5), click the IP address in the **Destination** column that you want to delete. The following dialog is displayed.<br>◦ |


**Figure 5-7. Delete Route**

b. Click **Delete** to remove the static route entry, or click **Cancel** to stop the operation and return to the Static Routes table.

## ADD SNMP COMMUNITIES

An SNMP community provides the authentication and authorization, through its community string, to view and/or change modem parameters. To enable SNMP access to the modem, SNMP community strings need to be configured.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **SNMP Communities** under **Configuration** to access the SNMP Community List page. Go to Step 2 to add an SNMP community, or go to Step 3 to change or delete an existing SNMP community. |

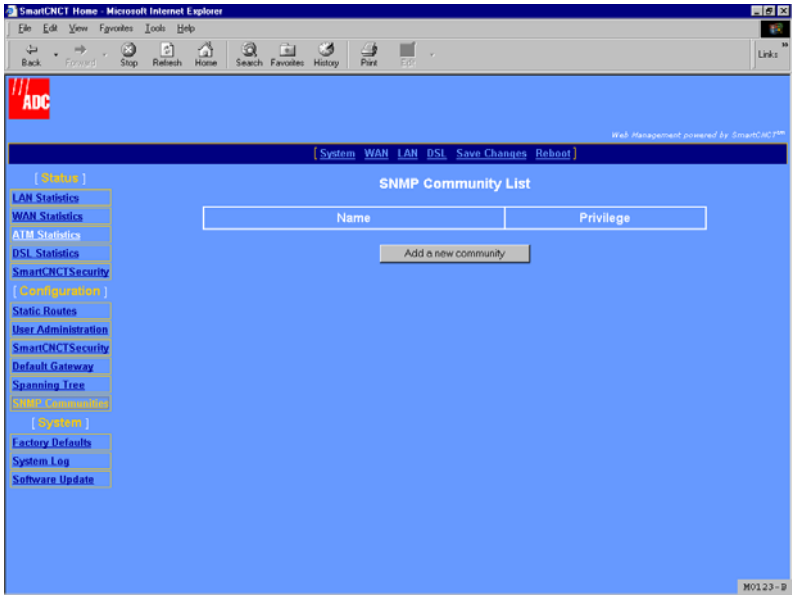



**Figure 5-8. SNMP Community List**

| Step | Action |
|---|---|
| 2 | To add a new SNMP community, do the following:<br>a. On the SNMP Community List page, click **Add a new community**. The following dialog is displayed (Figure 5-9). |

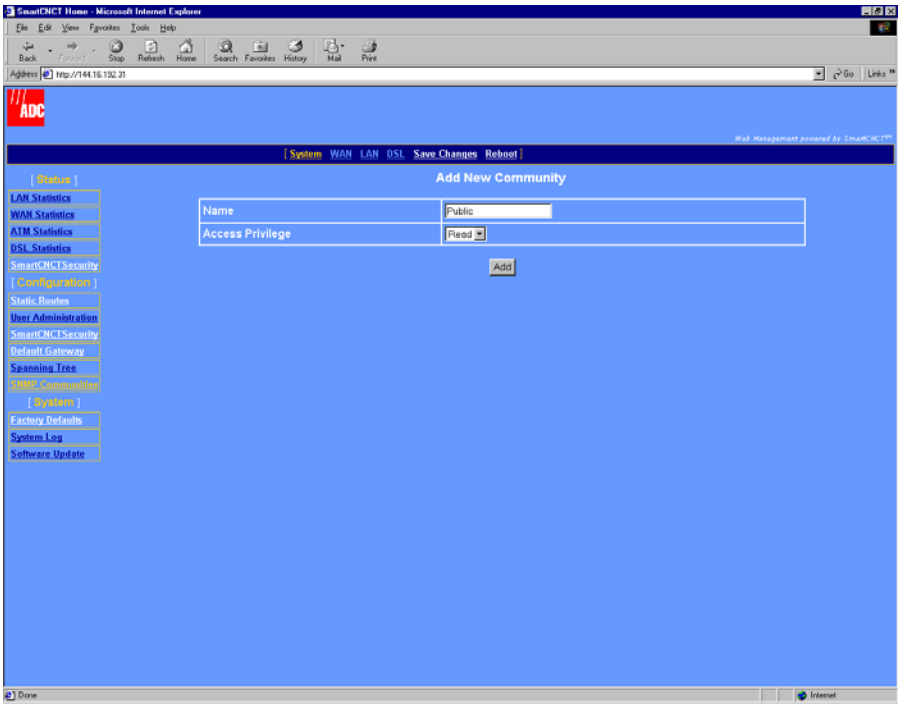



**Figure 5-9. Add New Community**

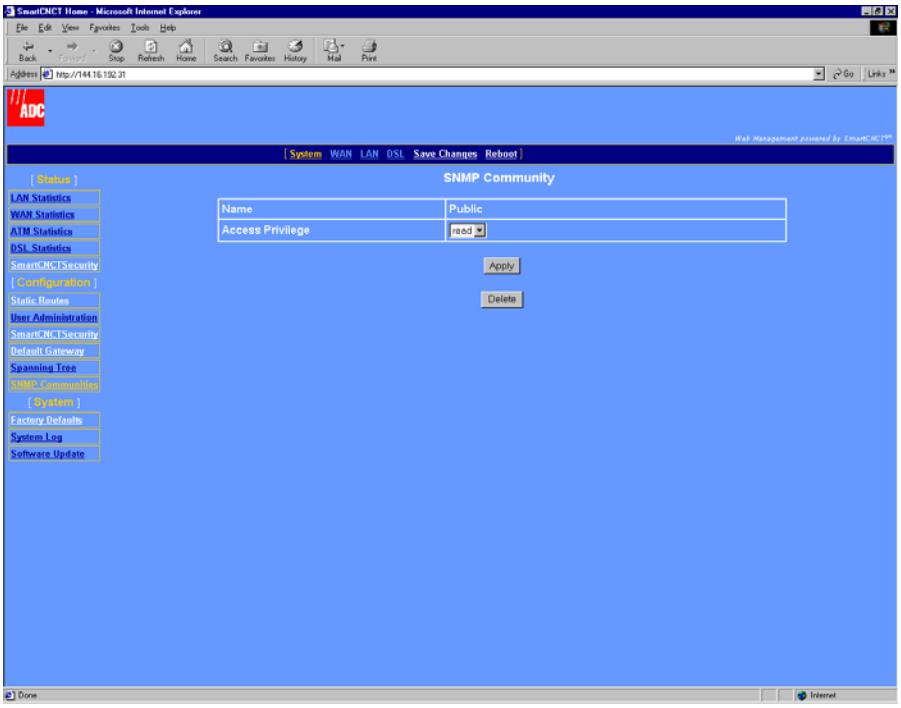
b. Enter the following information for the SNMP community.

- **Name**

  Identification for this SNMP community. All keyboard characters are allowed for this name, up to a maximum of 80 characters. You must add a community name in this field to later edit or delete the SNMP community. This name in the SNMP Community List table provides the link for editing or deleting the entry.
- **Access Privilege**

  The access allowed to this SNMP community. Accesses are either Read (view-only access) or Write (full view and write access).

c. Click **Add**. The new entry is added to and is displayed in the SNMP Community List table (see page 5-8).

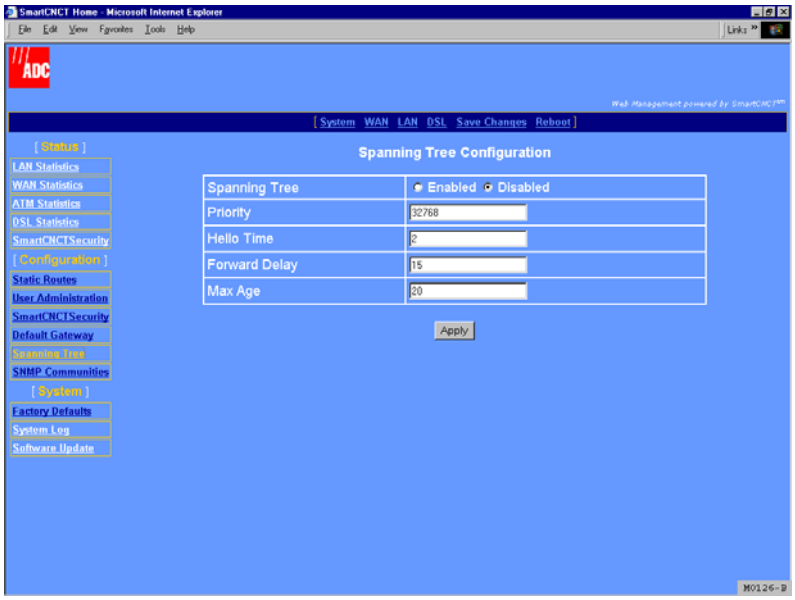
| Step | Action |
|---|---|
| 3 | To modify or delete an SNMP community, do the following:<br>a. From the SNMP Community List table, select the SNMP community **Name**. The following dialog is displayed (Figure 5-10).<br>  <br>**Figure 5-10. Delete SNMP Community**<br>b. Do one of the following:<br>– Change the **Access Privilege**, then click **Apply**.<br>– Click **Delete** to remove the static SNMP community. |

## CHANGE SPANNING TREE SETTING

Spanning tree eliminates loops in a LAN topology, ensuring there is only one path (or link) between any two nodes in a bridged network. Use spanning tree protocol (STP) when RFC 1483-Bridge protocol is assigned to either or both of the following:

- WAN sessions (see “Configure a New WAN Session” on page 4-2)
- LAN port and the LAN has more than one device (PCs and servers, for example) and those devices have more than one physical path connecting them.

The default spanning tree setting is *disabled*. Access spanning tree configuration as follows:

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **Spanning Tree** under **Configuration** to access the Bridge Spanning Tree page (Figure 5-11).<br>  <br><br>**Figure 5-11. Spanning Tree Configuration** |
| 2 | Enter the following parameters to enable STP for bridging sessions:<br>– **Spanning Tree**<br>Select Enable to activate the STP for all RFC 1483-Bridge sessions and LAN Port. Disable turns off STP for all modem bridging sessions and LAN Port.<br>– **Priority**<br>The modem STP priority (how centrally located this bridge is) in the network. A lower number indicates a more centrally located bridge. The valid priority range is 0 to 65535. A priority of 32768 is the default value.<br>– **Hello Time**<br>The time interval in seconds at which the modem should send STP packets. Default value is 2 seconds.<br>– **Forward Delay**<br>The time interval in seconds that should be waited until the state of an interface can change. This delay prevents interface states from changing so rapidly that STP cannot keep up with the current network topology and therefore cannot efficiently managing bridging. Default value is 15 seconds.<br>– **Max Age**<br>The time interval in seconds after which Spanning Tree entries that are not relearned are deleted from the bridging table. Default value is 20 seconds. |

## SAVING CHANGES

Use the Save Changes page for saving your current configuration to flash memory. This option immediately writes all current system configuration to permanent memory (NVRAM). You cannot selectively write configuration to NVRAM. When you issue the save command, all current configuration is written to NVRAM.

**Note:** When saving the modem configuration, do not power off the modem while the save is in process.

| Step | Action |
|---|---|
| 1 | Select **Save Changes** on the menu bar to access the Save Changes page (Figure 5-12). |

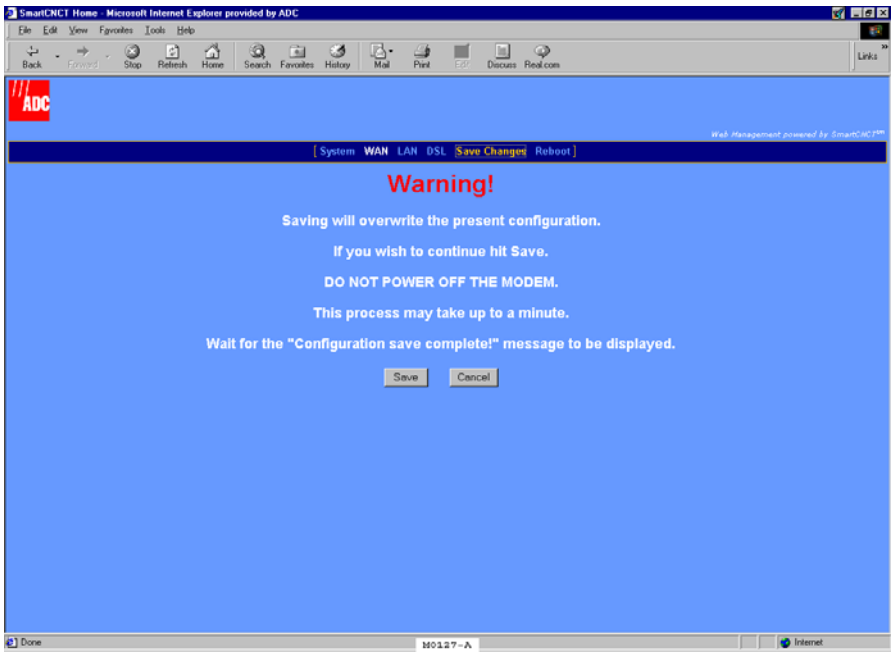
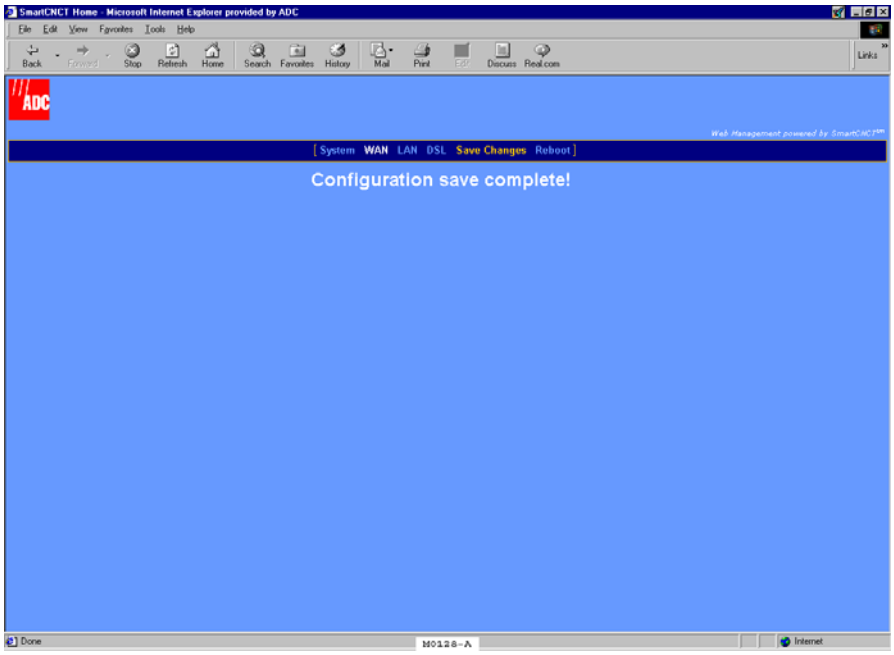



**Figure 5-12. Save Changes**

| Step | Action |
|---|---|
| 2 | Do one of the following:<br>a. Click **Save** to write the configuration to flash memory and do not power off the modem while the save is in progress. The following dialog (Figure 5-13) is displayed when the save is complete.<br>  <br>**Figure 5-13. Configuration Save Complete**<br>b. Click **Cancel** to exit the current page without saving your configuration. |

## REBOOTING THE MODEM

Before rebooting the modem, save any configuration changes you have made using the steps in "Saving Changes" on page 5-12.

| Step | Action |
|---|---|
| 1 | Select **Reboot** on the menu bar to access the Reboot page. |
| 2 | Do one of the following:<br>a. Click **Yes** to reboot the modem.<br>b. Click **No** to cancel the rebooting process. |

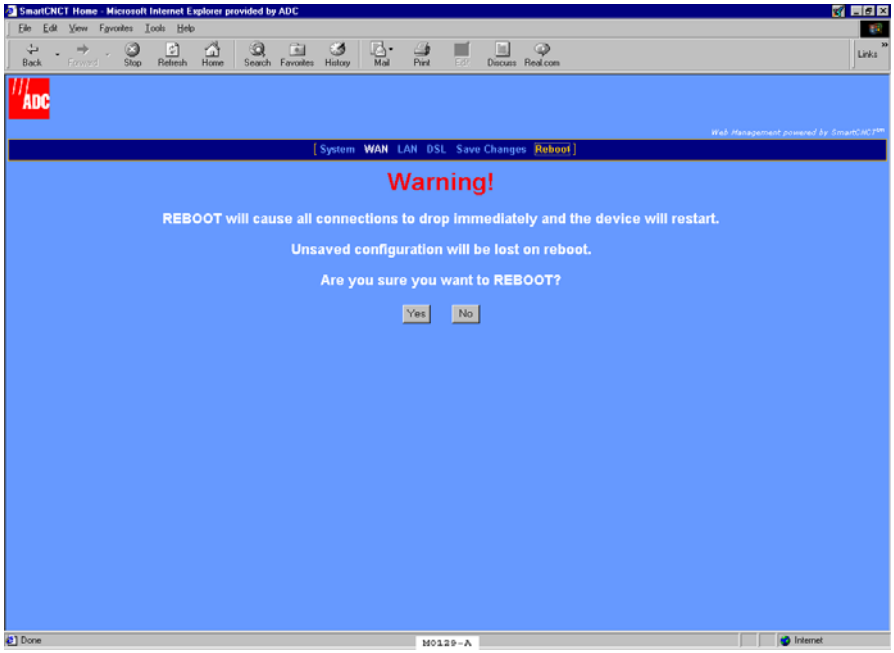



**Figure 5-14. Reboot**

**Note:** Refer to "Rebooting the Modem with the Reset Button" on page 1-6 for detailed information about rebooting the modem by pressing the Reset button located on the back panel.

**Note:** Refer to "Reset to Factory Defaults" on page 9-12 for detailed information about resetting the modem to return it to its original factory values (or defaults).

# Chapter 6

# CONFIGURING DSL PARAMETERS

The DSL parameters set up the G.shdsl communication between the modem and a DSLAM or between two modems used in a point-to-point application. Typically, the DSL parameters for the modem are preset to immediately synchronize with the service provider (DSLAM application). However, you may be instructed to make changes to the DSL configuration. This chapter provides information for setting G.shdsl parameters when the modem is in an application as a DSLAM endpoint. For instruction on setting up G.shdsl parameters for a point-to-point modem application, go to Chapter 7: Implementing a Point-To-Point LAN Extension.

## BEFORE YOU BEGIN

The following are configurable DSL parameters for the G.shdsl modem; change parameters only when instructed to do so by the service provider or your system administrator.

- The operating mode choices are Remote (use when the modem is an endpoint for a DSLAM application or the customer-side modem in a point-to-point application) or Central-Office (use only for the central office-side modem in a point-to-point application)
- Annex A or B provides the appropriate operating characteristics for G.shdsl, dependent on your geographical location.
- A margin value, in decibels, that must be met to initialize modem.
- Either fixed or adaptive mode that the modem will use to negotiate the best transmission rate at which both ends of the connection can synchronize.
- Wire pair mode: Single (two-wire), Dual (four-wire) or Dual-Enhanced can be selected only for the MM702G2 modem. The MM701G2 modem is used only in Single mode. Dual-Enhanced provides the Adaptive mode in four-wire operation.
- PSD mask is either symmetric or asymmetric. The values used to calculate the asymmetric mask are dependent on the Annex A or B you selected.

## COMPLETE A G.SHDSL QUICK CONFIGURATION

Configure basic operating parameters for the modem.

| Step | Action |
|---|---|
| 1 | Select **DSL** on the menu bar, then select **Quick Configuration** under **DSL Options**. |

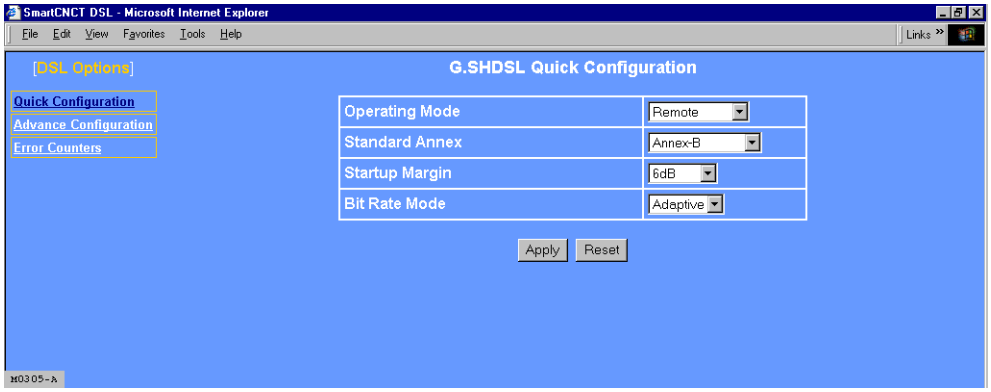
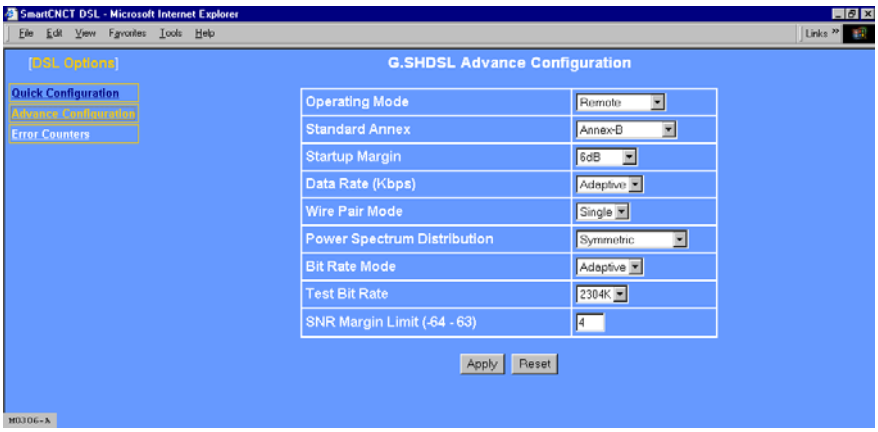



**Figure 6-1. DSL Quick Configuration**

| Step | Action |
|---|---|
| 2 | Configure the following parameters as directed by your service provider:<br>• **Operating Mode**<br>When the modem is connected to a service provider through a DSLAM, the operating mode is Remote (default setting).<br>When two modems are used in a point-to-point application (LAN extension, for example), one modem at the customer or user site is set to Remote and the second modem in the CO or wiring closet is set to Central-Office. For instruction on setting up G.shdsl parameters and other related parameters for a point-to-point modem application, go to Chapter 7: Implementing a Point-To-Point LAN Extension.<br>• **Standard Annex**<br>Select one of the following Annexes:<br>– **Annex-A** for operating conditions typically found in the North American implementation of G.shdsl<br>– **Annex-B** for operating conditions typically found in the European implementation of G.shdsl. This is the default mode for the modem.<br>– **Auto** for automatically negotiating the Annex A or B standard by which this modem, and the device to which this modem is attached, can operate.<br>• **Startup Margin**<br>The target signal-to-noise margin, in decibels, that the modem must achieve with a BER of $10^{-7}$ or better to successfully complete synchronization. The default margin value is -10 dB. A lower margin may result in a higher data rate, but it can increase noise on the line. Possible values are -10dB through 10dB, or to completely Disable the margin.<br>• **Bit Rate Mode**<br>**Bit rate mode** indicates how the modem synchronizes with the device to which it is attached in either a Fixed or Adaptive mode. The default for the modem is Adaptive mode.<br>– **Fixed mode** indicates that the modem will synchronize with the other end (a DSLAM or another modem) at a fixed bit rate through negotiation. The modem will synchronize at the best rate, up to the data rate specified (see “Data Rate (kbps)” on page 6-4), that can be achieved by both ends.<br>– **Adaptive mode** indicates that prior to modem negotiating a rate, the modem performs an adaptation phase during which it determines a best possible rate based on conditions of the line. After adaptive mode, the modem will then negotiate the best rate that can be achieved with the other end, based on the adaptation results. |
| 3 | Click **Apply**. |

## COMPLETE A DSL ADVANCED CONFIGURATION

Configure the G.shdsl parameters for the modem to facilitate it synchronizing with either a DSLAM or another modem to which it attaches.

| Step | Action |
|---|---|
| 1 | Select **DSL** on the menu bar, then select **Advance Configuration** under **DSL Options**.<br>  <br>**Figure 6-2. G.SHDSL Advanced Configuration** |
| 2 | Configure the following parameters as directed by your service provider:<br>• **Operating Mode**<br>When the modem is connected to a service provider through a DSLAM, the operating mode is Remote (default setting).<br>When two modems are used in a point-to-point application (LAN extension, for example), one modem at the customer or user site is set to Remote and the second modem in the CO or wiring closet is set to Central-Office. For instruction on setting up G.shdsl parameters and other related parameters for a point-to-point modem application, go to Chapter 7: Implementing a Point-To-Point LAN Extension.<br>• **Standard Annex**<br>Determines the transmission standards to which this G.shdsl connection will comply. The Annex standard should be the same at both ends of the connection. Select one of the following Annexes:<br>– **Annex-A** for operating conditions typically found in the North American implementation of G.shdsl<br>– **Annex-B** for operating conditions typically found in the European implementation of G.shdsl. This is the default mode for the modem.<br>– **Auto** for automatically negotiates the Annex A or B standard by which this modem, and the device to which this modem is attached, can operate. |

| Step | Action |
|---|---|
| 2 (cont.) | • **Startup Margin**<br><br>The target signal-to-noise margin, in decibels, that the modem must achieve with a BER of $10^{-7}$ or better to successfully complete synchronization. The default margin value is -10 dB. A lower margin may result in a higher data rate, but it can increase noise on the line. Possible values are -10 dB through 10 dB, or to completely Disable the margin. The default value is -10 dB.<br><br>• **Data Rate (kbps)**<br><br>Data rate determines the maximum transmission rate, in kilobits per second, up to which the modem can negotiate and synchronize with another device (modem or a DSLAM) to which it is attached. When the Bit Rate Mode (see "Bit Rate Mode" below) is set to Fixed, the range of values are (ADC modems comply with the standard G.shdsl data rate range):<br>– for the MM702G2 modem, 384 kbps to 4608 kbps, in 128 kbps increments<br>– for the MM701G2 modem, 192 kbps to 2304 kbps, in 64 kbps increments<br><br>Rates down to 64 kbps are supported only when operating in single-pair, point-to-point mode with another ADC modem. (see Chapter 7: Implementing a Point-To-Point LAN Extension).<br><br>When the Bit Rate Mode (see "Bit Rate Mode" below) is set to Adaptive for an MM701G2 (Adaptive is default value) or for an MM702G2 set to Single Wire Pair Mode only (see "Bit Rate Mode" below), this field is automatically set to Adaptive. The default value is Adaptive.<br><br>• **Wire Pair Mode**<br><br>Indicates whether the G.shdsl modem is operating in a two-wire mode (Single), a four-wire mode (Dual), or a Dual Enhanced mode. For the MM701G2 modem, Single mode is the only setting available. For the MM702G2 modem, you can select Single, Dual mode, or Dual Enhanced mode. The default value is Single.<br><br>• **Power Spectrum Distribution**<br><br>The Power Spectral Density (PSD) plots the variations of signal power with signal frequency for the G.shdsl transmission between the modem and the DSLAM or the modem and another modem. Symmetric PSD indicates that the PSD mask for both sides of the transmission (the CO- and remote-side) are the same (symmetric).<br><br>Asymmetric PSD indicates that the PSD mask for both sides of the transmission (the CO- and remote-side) are not the same (asymmetric). There are two unique numeric values (AsymmetricRate1 and AsymmetricRate2) used to determine the asymmetric PSD mask based on the Annex A or Annex B standard that you selected (see page 6-3). AsymmetricRate1 is 784 kbps for Annex A and 2312 kbps for Annex B. AsymmetricRate2 is 1552 kbps for Annex A and 2056 kbps for Annex B.<br><br>Both ends of the connection must be set for the same Symmetric or Asymmetric PSD. The default is Symmetric.<br><br>• **Bit Rate Mode**<br><br>**Bit rate mode** indicates how the modem synchronizes with the device to which it is attached in either a Fixed or Adaptive mode. The default for the modem is Adaptive mode.<br>– **Fixed mode** indicates that the modem will synchronize with the other end (a DSLAM or another modem) at a fixed bit rate through negotiation. The modem will synchronize at the best rate, up to the data rate specified (see "Data Rate (kbps)" above), that can be achieved by both ends.<br>– **Adaptive mode** indicates that prior to modem negotiating a rate, the modem performs an adaptation phase to determine a best possible rate based on conditions of the line. After adaptive mode, the modem negotiates the best rate that can be achieved with the other end, based on the adaptation results. |

| Step | Action |
|---|---|
| 2 (cont.) | • **Test Bit Rate**<br>This bit rate is used by the manufacturer for internal use only.<br>• **SNR Margin Limit**<br>Identifies the minimum SNR margin (in decibels) that must exist when the G.shdsl connection is synchronized and in order for the DSL MAR LED to be lit ON Green. The range of values is -64 to 63. The default value is 6. |
| 3 | Click **Apply** then save changes using “Saving Changes” on page 5-12. |

# Chapter 7

# Implementing a Point-To-Point LAN Extension

Two ADC G.shdsl modems can be implemented in a point-to-point application (also called back-to-back). In this application, the modems can be used to connect remote LANs to create LAN extensions. In this point-to-point application, one ADC G.shdsl modem is set to Remote mode and the other ADC G.shdsl modem is set for Central-Office mode. By bridging traffic between these two modems, you essentially create one extended LAN that allows the use of a single IP subnet. Note you can also set up a routing session in back-to-back modem configurations with MM701G2 and 384 to 4608 Kbps with MM702G2.

Although you can set up multiple sessions on these modems, only one RFC 1483-Bridge sessions is required for implementing a point-to-point LAN extension.

The ADC modems comply with the standard G.shdsl data rate range of 192 kbps to 2304 kbps. Additionally, rates down to 64 kbps are supported only when using the G.shdsl modem in single-pair, point-to-point mode for a LAN extension application.

## Before You Begin

Determine which of these implementations apply for your application:

- **Quick Install**—If your application does not require custom configuration, you can use the default modem settings. To implement, the Remote mode modem is already configured with factory default configuration for implementing point-to-point LAN extension. The Central-Office modem requires only two configuration changes to set the modem to Central-Office mode. These changes are described in “Complete a Quick Installation” below.
- **Custom Configuration**—If you implement custom configuration where you do not use factory default parameters for your modems, refer to “Complete a Custom Configuration” on page 7-3 to configure the Remote modem and to configure the Central-Office modem.

## Complete a Quick Installation

**Note:** The modem is shipped with factory defaults as a Remote modem.

With V3.2.0, there are two RFC-1483 WAN Bridging sessions with PVC’s 0/35 and 0/100. For point-to-point LAN extension applications, delete one WAN session.

### Configure for Central-Office Mode

| Step | Action |
|---|---|
| 1 | Select **DSL** on the menu bar, then select **Advance Configuration** under **DSL Options**. |
| 2 | In the **Operating Mode** box, select **Central-Office** to set up this modem for this mode. |
| 3 | Click **Apply**. |

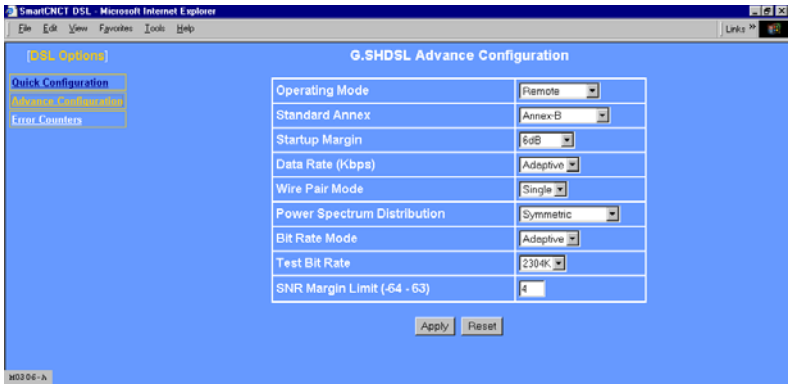



**Figure 7-1. G.SHDSL Advanced Configuration—Configure for Central-Office Mode**

### Change the LAN IP Address for the Central-Office Modem

Because the Central-Office and Remote modems by default have the same IP Address 10.0.0.1 point-to-point application, you must change the IP address for the Central-Office modem or Remote Modem.

| Step | Action |
|---|---|
| 1 | Select **LAN** on the menu bar to access the LAN Configuration page. |

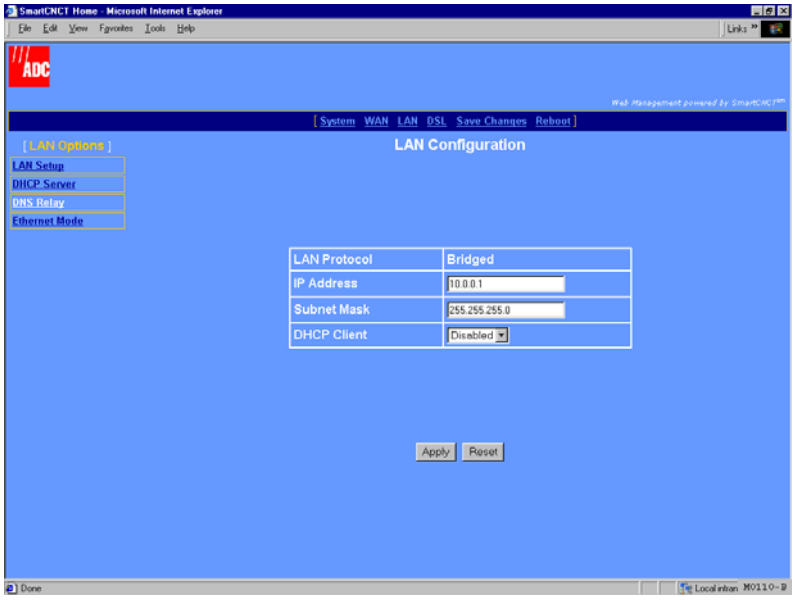



**Figure 7-2. LAN Configuration**

| Step | Action |
|---|---|
| 2 | In the IP address box, enter **10.0.0.2**.<br><br>**Note:** Any device (such as a PC) connecting to the modem LAN interface loses its connection when the modem LAN IP address is changed. After the IP address is changed, you need to specify this new address in the Web browser to reconnect a device. |
| 3 | Click **Apply** to activate the changes. The connection to the Web interface will be lost because the modem now has a new LAN IP address. |
| 4 | In the Web browser address field (see "Accessing the Modem Web Pages" on page 2-3), specify **http://10.0.0.2** to reconnect. |
| 5 | Click **Save Changes** on the menu bar to prevent losing the configuration after restoring communication with the modem. |

You are now finished with the Quick Installation. To verify connectivity, refer to "Verify Connectivity" on page 7-9.

## Complete a Custom Configuration

If you implement custom configuration where you do not use factory default parameters for your modems, you will need to make changes to the configuration on both the Remote and the Central-Office modem. The following sections provide configuration changes for the Remote modem and then for the Central-Office modem.

### Configure the Remote Modem

To configure the remote modem, you need to change the following settings:

- Operating mode for the modem, (see "Configure the Remote Operating Mode" on page 7-3)
- WAN parameters, (see "Configure the Remote WAN" on page 7-4)
- LAN parameters, (see "Configure the Remote LAN" on page 7-5)

#### Configure the Remote Operating Mode

| Step | Action |
|---|---|
| 1 | Select **DSL** on the menu bar then select **Advance Configuration** under **DSL Options**. |
| 2 | In the **Operating Mode** box, select **Remote** to configure the modem for this mode. |
| 3 | Click **Apply**. |

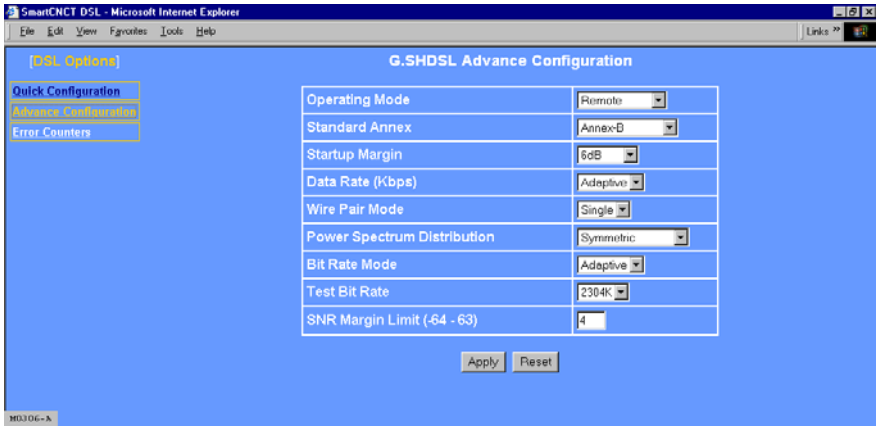



**Figure 7-3. G.SHDSL Advanced Configuration—Configure Remote Operating Mode**

## Configure the Remote WAN

| Step | Action |
|---|---|
| 1 | Select **WAN** on the menu bar to access the WAN Configuration page (Figure 7-4). |
| 2 | Select **RFC 1483 bridged** from the WAN Configuration page to display the following page (Figure 7-5). |
| 3 | In the **Session Name** box, assign a name to this session. |
| 4 | In the **Virtual Path ID (VPI 0 - 4,095)** box, enter the Virtual Path ID. This must match the Virtual Path ID of the Central-Office modem. |
| 5 | In the **Virtual Channel ID (VCI 32 - 65,535)** box, enter the Virtual Channel ID. This must match the Virtual Channel ID of the Central-Office modem. |
| 6 | Click **Apply**. |

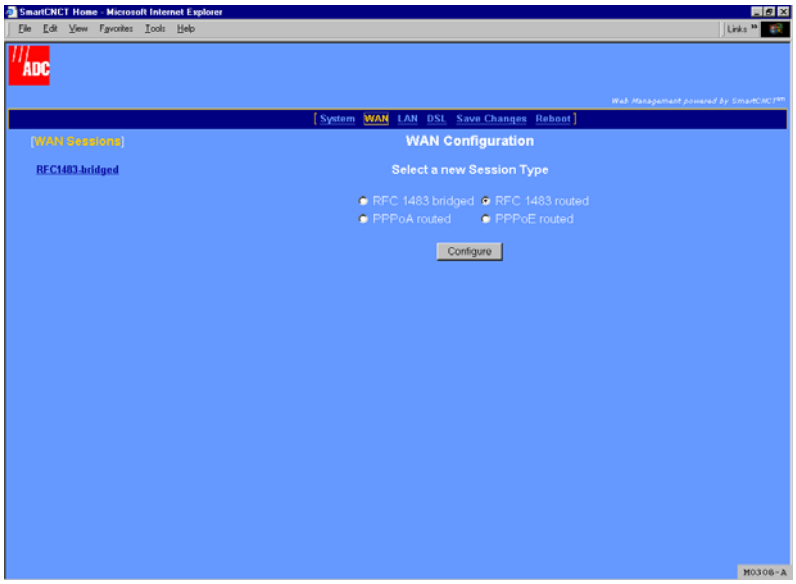



**Figure 7-4. WAN Configuration**

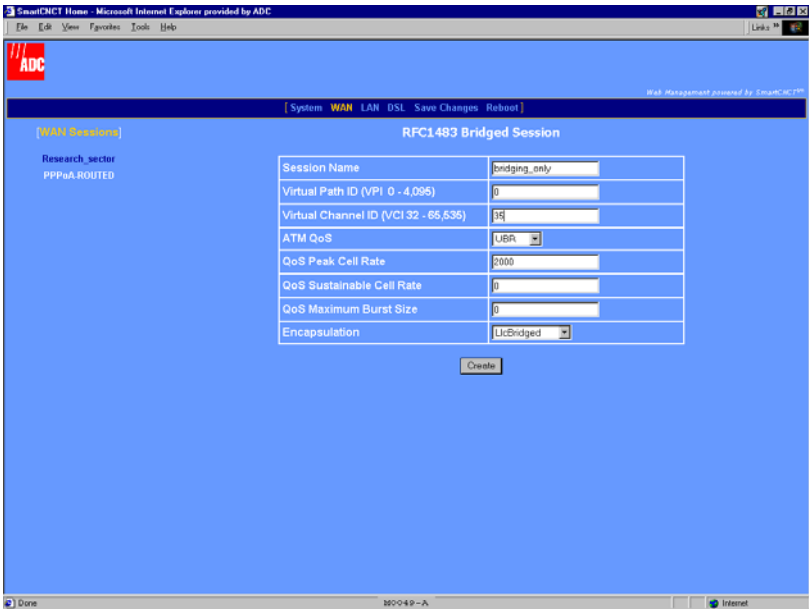
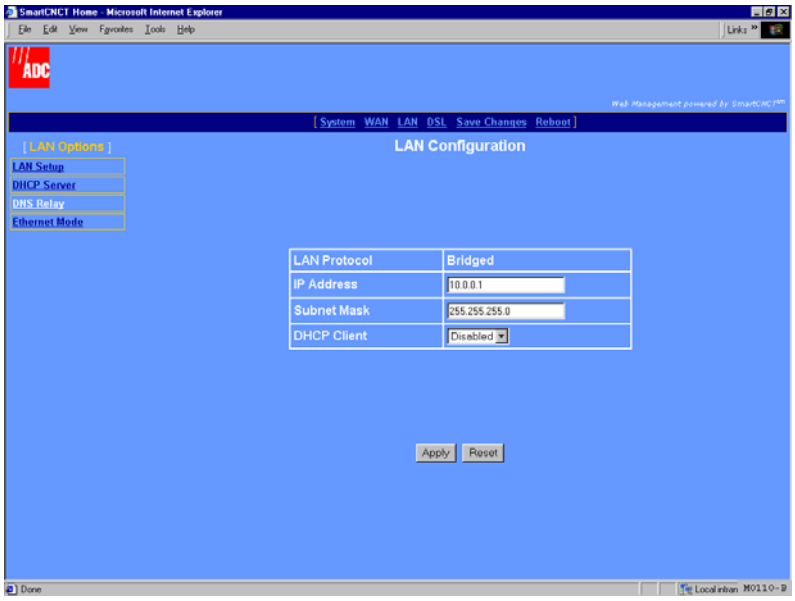



**Figure 7-5. RFC1483 Bridged Session**

## Configure the Remote LAN

| Step | Action |
|---|---|
| 1 | Select **LAN** on the menu bar, then select **LAN Setup** under **LAN Options** to access the LAN Configuration page (Figure 7-6).<br>  <br><br>**Figure 7-6. LAN Configuration—Configure Remote LAN** |
| 2 | In the **LAN Protocol** box, confirm that the protocol is set to Bridged.<br><br>**Note:** If the protocol is not set to bridged, it can be changed only through the command line interface.<br><br>See Appendix A: “Command Line Interface Access” on page A-1 for procedures on using this interface to change the LAN protocol.<br><br>**Note:** Any device (such as a PC) connecting to the modem LAN interface loses its connection when the modem LAN IP address is changed. After the IP address is changed, you need to specify this new address in the Web browser to reconnect a device. |
| 3 | In the **IP Address** box, enter an available IP address on your subnet. |
| 4 | Click **Apply**. |

| Step | Action |
|---|---|
| 5 | Select **Save Changes** on the menu bar to access the Save Changes page (Figure 7-7). |
| 6 | Click **Save** to save the configuration to flash memory. |

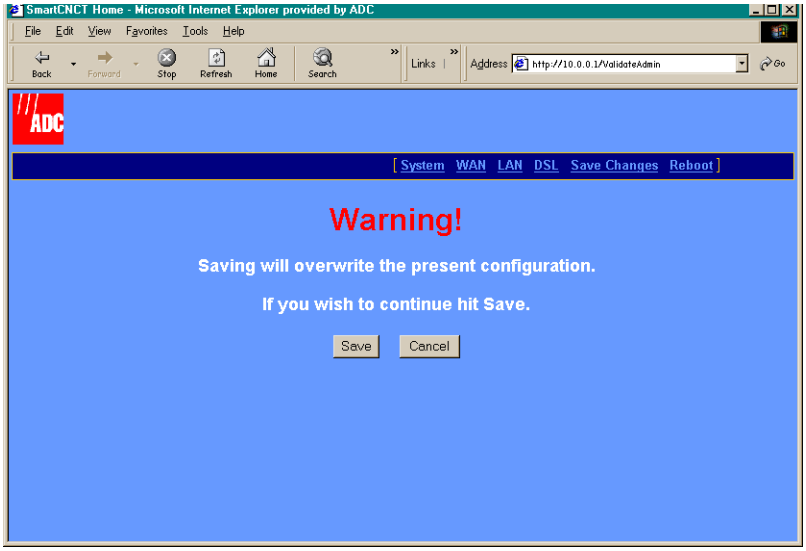



**Figure 7-7. Save Changes Page**

## Configure the Central-Office Modem

To configure the central-office modem, you need to change the following settings:

- Operating mode for the modem, (see "Configure the Central-Office Operating Mode" on page 7-6)
- WAN parameters, (see "Configure the Central-Office WAN" on page 7-7)
- LAN parameters, (see "Configure the Central-Office LAN" on page 7-8)

### Configure the Central-Office Operating Mode

| Step | Action |
|---|---|
| 1 | Select **DSL** on the menu bar; then select **Advance Configuration** under **DSL Options**. |
| 2 | In the **Operating Mode** box, select **CO** to configure the modem for this mode. |
| 3 | Click **Apply**. |

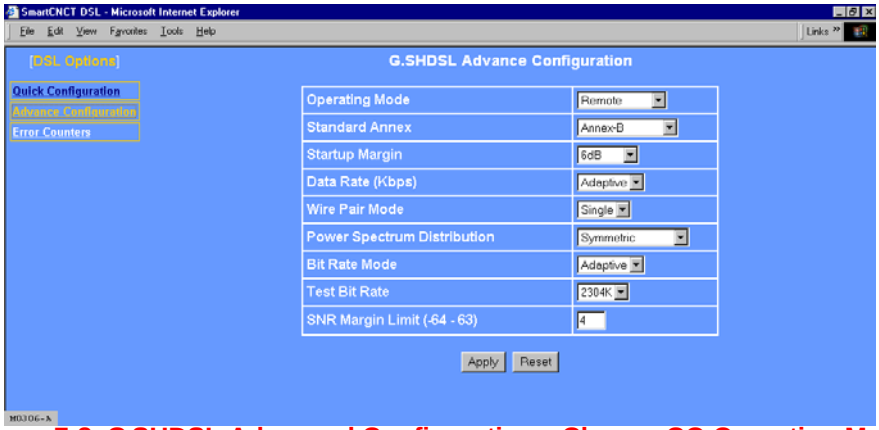
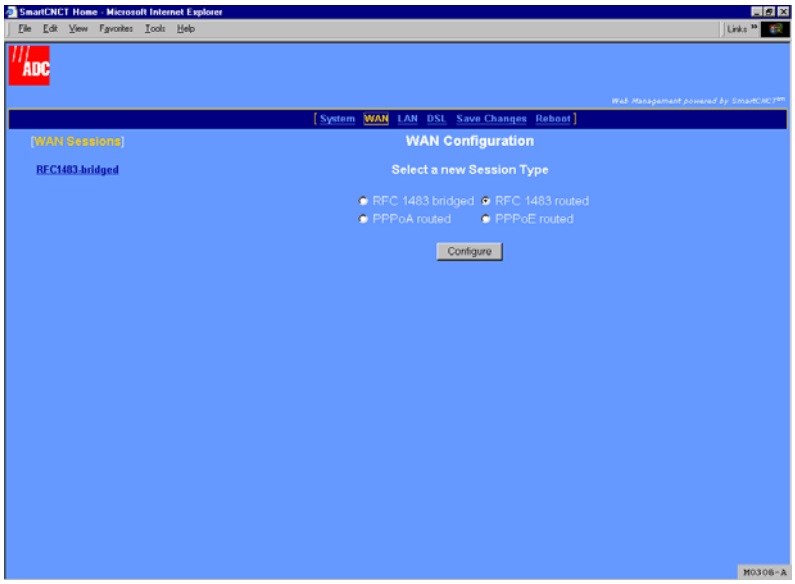
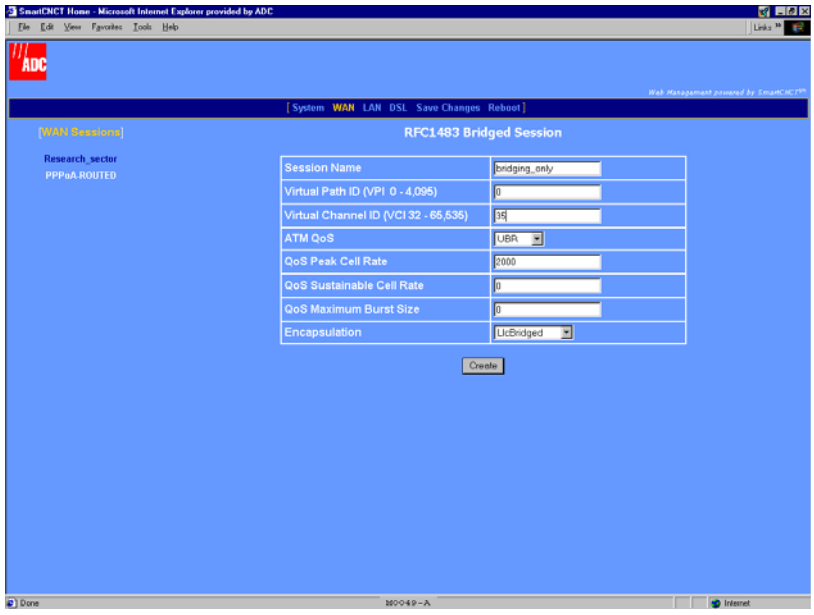
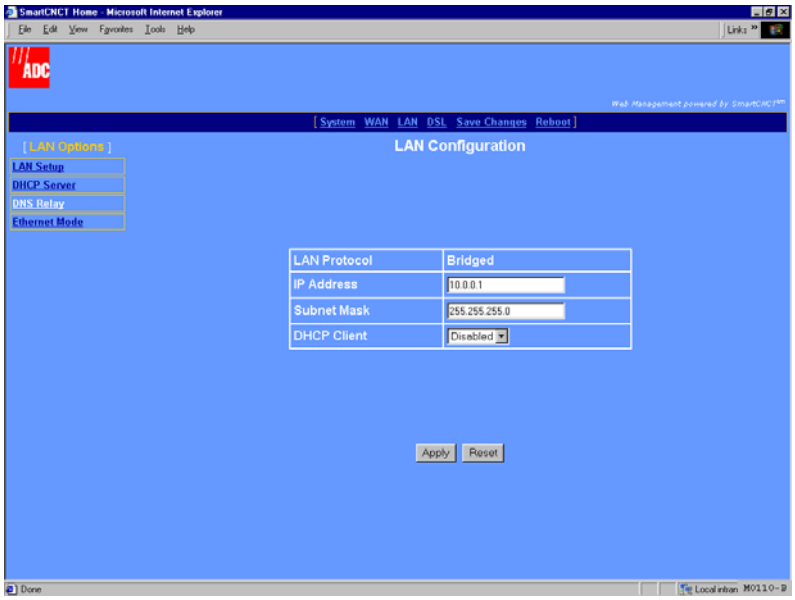


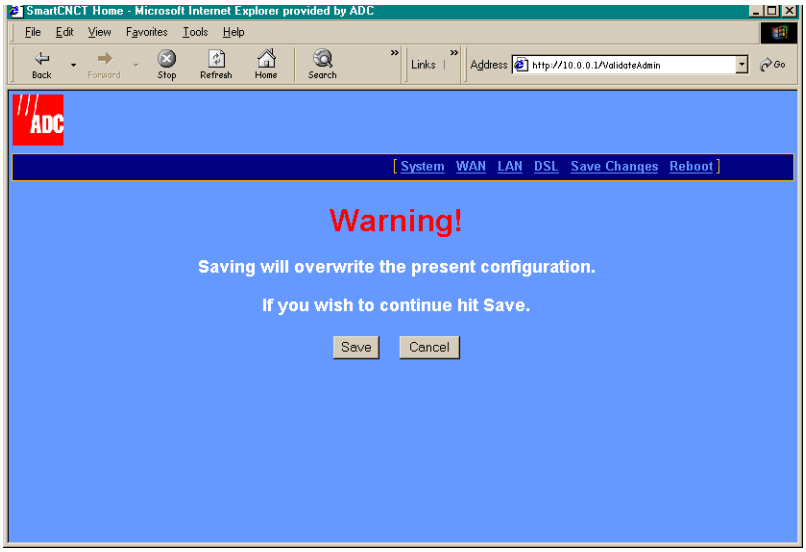

**Figure 7-8. G.SHDSL Advanced Configuration—Change CO Operating Mode**

## Configure the Central-Office WAN

| Step | Action |
|---|---|
| 1 | Select **WAN** on the menu bar to access the WAN Configuration page (Figure 7-9).<br>  <br><br>**Figure 7-9. WAN Configuration** |
| 2 | Select **RFC 1483 bridged** from the WAN Configuration page to display the following page (Figure 7-10).<br>  <br><br>**Figure 7-10. RFC1483 Bridged Session** |
| 3 | In the **Session Name** box, assign a name to this session (can be the same as the Remote modem). |
| 4 | In the **Virtual Path ID (VPI 0 - 4,095)** box, enter the Virtual Path ID. This must match the Virtual Path ID of the Remote modem. |
| 5 | In the **Virtual Channel ID (VCI 32 - 65,535)** box, enter the Virtual Channel ID. This must match the Virtual Channel ID of the Remote modem. |
| 6 | Click **Apply**. |

## Configure the Central-Office LAN

| Step | Action |
|---|---|
| 1 | Select **LAN** on the menu bar, then select **LAN Setup** under **LAN Options** to access the LAN Configuration page (Figure 7-11).<br>  <br><br>**Figure 7-11. LAN Configuration—Configure CO LAN** |
| 2 | In the **LAN Protocol** box, confirm that the protocol is set to Bridged.<br><br>**Note:** If the protocol is not set to bridged, it can be changed only through the command line interface.<br><br>See Appendix A: "Command Line Interface Access" on page A-1 for procedures on using this interface to change the LAN protocol.<br><br>**Note:** Any device (such as a PC) connecting to the modem LAN interface loses its connection when the modem LAN IP address is changed. After the IP address is changed, you need to specify this new address in the Web browser to reconnect a device. |
| 3 | In the **IP Address** box, enter an available IP address on your subnet. |
| 4 | Click **Apply**. |

| Step | Action |
|---|---|
| 5 | Select **Save Changes** on the menu bar to access the Save Changes page.<br>  <br>**Figure 7-12. Save Changes—CO LAN** |
| 6 | Click **Save** to save the configuration to flash memory. |

## VERIFY CONNECTIVITY

After you have performed each of the previous configuration changes, verify back-to-back communication by passing traffic over the WAN session. For example, set up a PC on the LAN-side of the Remote modem and another PC on the LAN-side of the Central-Office modem. Then, transfer a file or ping between the two PCs. This generates traffic and tests connectivity.

| Step | Action |
|---|---|
| 1 | On the front panel of one of the modems, check the status of the SYNC LED. If it is blinking, it is attempting to establish communication with the other modem. If it is on solid green, it has already synchronized its connection with the other modem. See “LED Status Indications” on page 1-5 for further definitions of LEDs indications. |

| Step | Action |
|---|---|
| 2 | Select **System** on the menu bar, then select **ATM Statistics** under **Status** to access the ATM Statistics page (Figure 7-13). |
| 3 | View the statistics. If the RX Cell and TX Cell values increment, the two modems have established communication and are passing traffic. If they do not, refresh the page by clicking the **Refresh** button on your Web browser. If the counters still do not increment, verify each modem for the correct configuration parameters. |

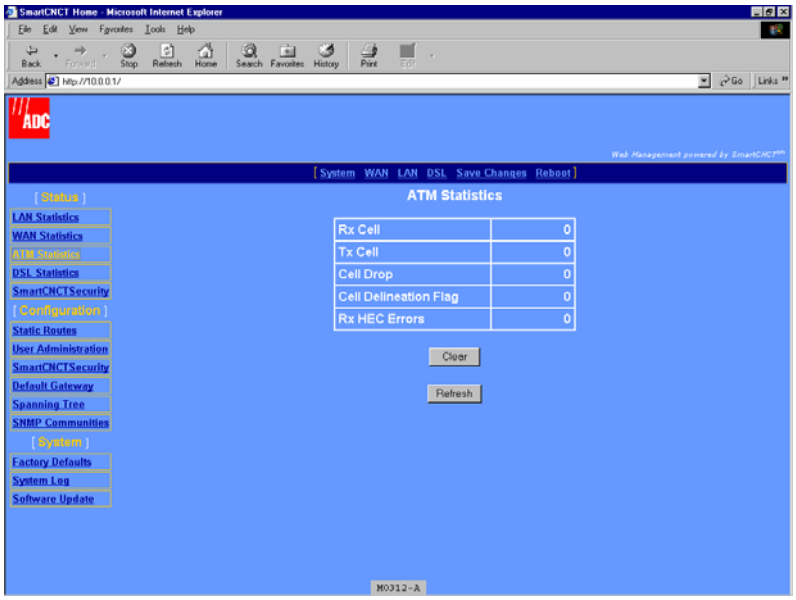



**Figure 7-13. ATM Statistics**

# Chapter 8

# CONFIGURING NAT

SmartCNCT Security provides both firewall and security features for the modem, protecting it from unwanted intrusion. NAT, which is part of security, is the only SmartCNCT Security feature available this release.

**Note:** SmartCNCT Security, except NAT, is not supported in this release. Although the Web interface has configuration for this features, do not change any settings other than those for NAT that are covered in this chapter.

## BEFORE YOU BEGIN

- Set up WAN sessions. These sessions provide the external interface (public WAN IP address) to which NAT is bound.
- Identify all internal interfaces (private IP addresses) that you will bind to the external interfaces with which you bound NAT.

## CONFIGURE NAT

NAT provides the ability to map private IP address on the LAN to public IP addresses (WAN) that are assigned to each session. This essentially hides the private IP addresses behind the public IP addresses assigned to WAN sessions. Prior to binding NAT to a WAN IP address, you should have previously set up PPPoA routed, PPPoE routed, or RFC 1483 routed WAN sessions (see “Configure a New WAN Session” on page 4-2). You cannot configure NAT for RFC 1483 bridged sessions.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **SmartCNCTSecurity** under **Configuration** to access the Security Interface Configuration page (Figure 8-1). |

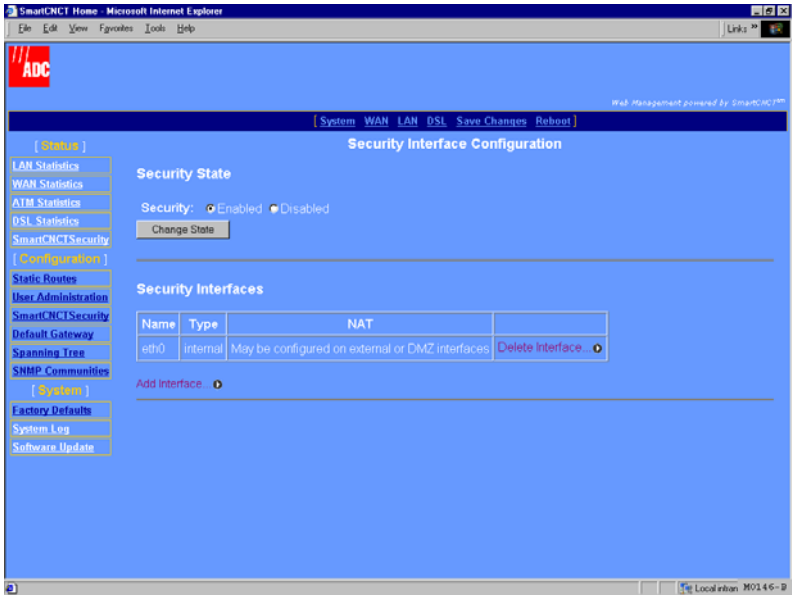



**Figure 8-1. Security Interface Configuration**

| Step | Action |
|---|---|
| 2 | Select **Add Interface**, which is a link below the **Security Interfaces** table, to display the Firewall Add Interface page (Figure 8-2).<br>  <br><br>**Figure 8-2. Firewall–Add Interface**<br><br>**Note:** In the Session Name to Interface Mapping table, the Session Name is the name you assigned to a session during configuration. The Interface is the protocol type selected for that session and corresponds to the Name: field at the top of the page. NAT is attached to this session which is an external (WAN) interface. |
| 3 | In the **Name** box, select the session (interface from the **Session Name to Interface Mapping** table shown on page 78) as the external interface to which NAT is bound. |
| 4 | In the **Interface Type** box, select external. |
| 5 | Click **Apply** and you automatically return to the Security Interface Configuration page. |
| 6 | To bind this session with NAT to internal interfaces (private LAN-side IP addresses), click the button **Enable NAT to internal interfaces** located in the **NAT** column in the Security Interfaces table. To disable the binding of this session with NAT to internal interfaces, click the button **Disable NAT to internal interfaces** located in the **NAT** column in the Security Interfaces table. |

# Chapter 9

# MANAGING THE MODEM

This chapter provides information and procedures to assist you in the fault management and maintenance of the modem, including the following.

- Summary of the modem status (from the System page) provides valuable information to manage and trouble-shoot the modem.
- Summary of DSL performance provides DSL error counters and DSL link statistics.
- **Factory Default** parameter provides the capability to return the modem from a current configuration to known default parameters.

## VIEW SYSTEM STATUS

System status provides an overall management view of the modem configuration and performance. The system page, which also functions as the Web interface home page, provides a management view of modem configuration.

### View Modem Status

The System Status page is a read-only summary of the current modem configuration. It includes information about the modem software, DSL configuration values, WAN session settings, and LAN parameters. Use it as an overview of the modem status.

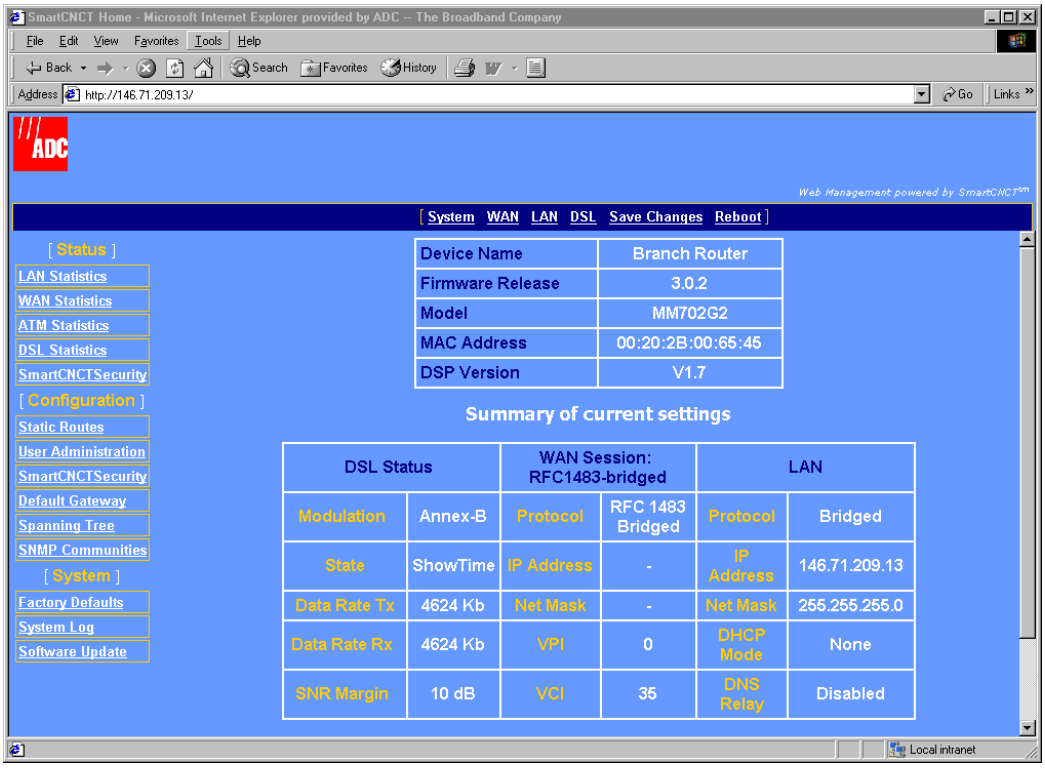



**Figure 9-1. System Status**

The following is a description of the fields at the top of the Status page:

- **Device Name**

  Identifies the modem and its LAN connection type (Ethernet port). This is not a configurable parameter.
- **Firmware Release**

  Identifies the version number of the software image currently used on the modem.
- **Model**

  Identifies the model of the modem.
- **MAC Address**

  Identifies the unique, hardware address assigned to and resident on the modem.
- **DSP Version**

  Identifies the version of the G.shdsl firmware driver used for the modem.

The following is a description of the fields in the Summary of current settings table:

- **DSL Status**

  Provides configuration values specific to G.shdsl, including:
  - **Modulation**—Indicates the G.shdsl transmission standard to which the modem is set.
  - **State**—Status of the DSL link.
  - **Data Rate TX**—Bit rate at which the is configured to send data.
  - **Data Rate RX**—Bit rate at which the is configured to receive data.
  - **SNR Margin (DB)**—Current SNR margin in decibels.
- **WAN Session**

  See “Configure a New WAN Session” on page 4-2 for definitions of WAN Session fields.
- **LAN**

  See “Configure the LAN” on page 3-1 for definitions of LAN fields.

### View System Log

The Configuration Error Log shows errors that have occurred during the time the modem is operational. This error log is used by the manufacturer for internal use only.

Select **System** on the menu bar, then select **System Log** under **System** to access the Configuration Error Log page (Figure 9-2).

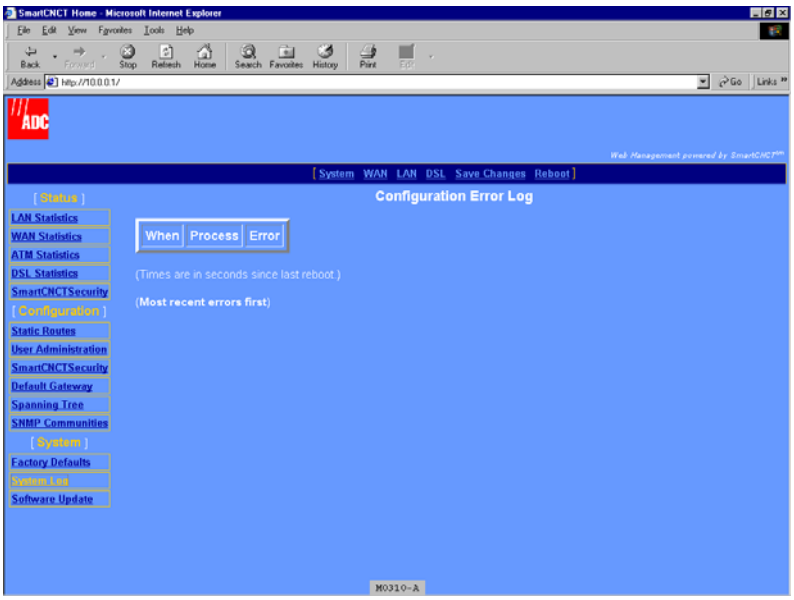



**Figure 9-2. Configuration Error Log**

## VIEW WAN STATISTICS

WAN Statistics provide information about packets received and transmitted for every WAN session configured for the modem.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **WAN Statistics** under **Status** to access the WAN Statistics page (Figure 9-3). |

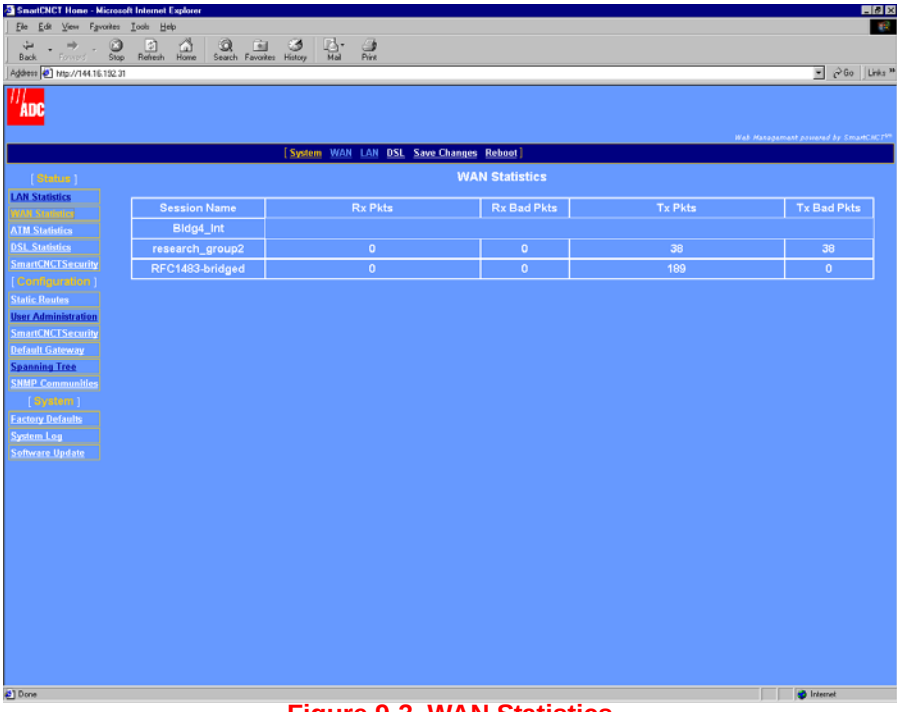



**Figure 9-3. WAN Statistics**

| Step | Action |
|---|---|
| 2 | View the current statistics as described below:<br>• **Session Name**<br>Identifies the session name, for up to 32 sessions, for which the transmitted and received packets are being reported.<br>• **Rx Pkts**<br>The total number of packets received for this session.<br>• **Rx Bad Pkts**<br>The total number of errored packets received for this session.<br>• **Tx Pkts**<br>The total number of packets transmitted for this session.<br>• **Tx Bad Pkts**<br>The total number of errored packets transmitted for this session. |

## VIEW LAN STATISTICS

LAN Statistics provide information about packets received and transmitted on the LAN Port of the modem.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **LAN Statistics** under **Status** to access the LAN Statistics page (Figure 9-4). |

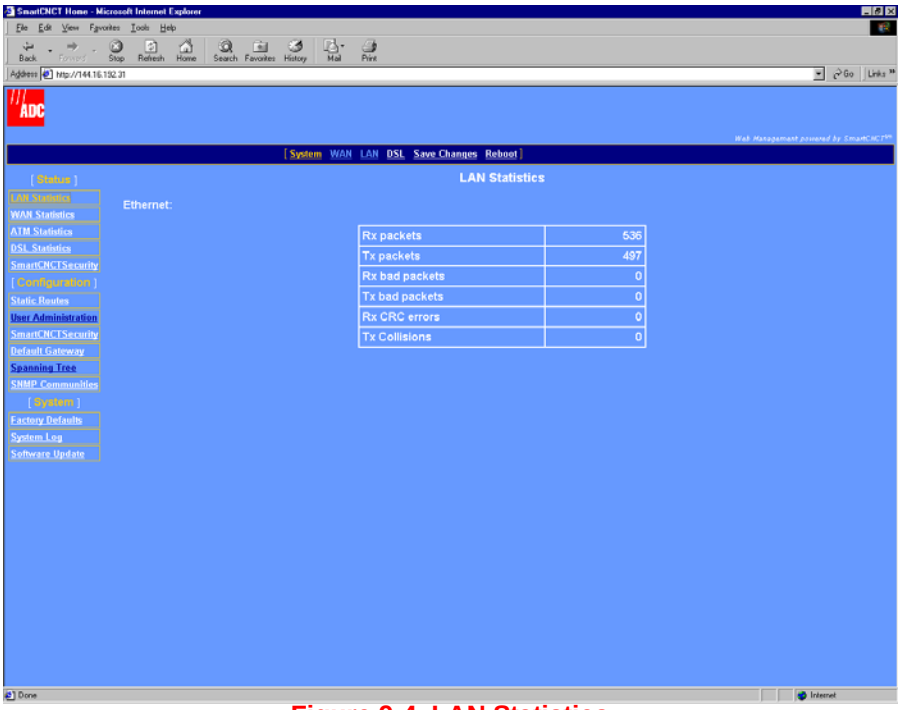



**Figure 9-4. LAN Statistics**

| Step | Action |
|---|---|
| 2 | View the current statistics as described below. The statistics are provided for a connection to the Ethernet port.<br>• **Rx Pkts**<br>The total number of Ethernet packets received on this port.<br>• **Tx Pkts**<br>The total number of Ethernet packets transmitted on this port.<br>• **Rx Bad Pkts**<br>The total number of errored Ethernet packets received on this port.<br>• **Tx Bad Pkts**<br>The total number of errored Ethernet packets transmitted on this port.<br>• **Rx CRC Errors**<br>The total number of Cyclic Redundancy Code (CRC) errors received for Ethernet packets on this port.<br>• **Tx Collisions**<br>The total number of collisions occurring between devices attempting to transmit Ethernet packets on this port. |

## VIEW SMARTCNCT SECURITY STATISTICS

The Security Status page provides information about SmartCNCTSecurity that is configured for the modem.

**Note:** SmartCNCTSecurity, except NAT, is not supported in this release.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **SmartCNCTSecurity** under **Status** to access the Security Status page (Figure 9-5). |
| 2 | View the current statistics as described below:<br>• **Security Enabled**<br>True indicates that security is enabled. False indicates that security is not enabled.<br>• **NAT Enabled**<br>True indicates that NAT is enabled. False indicates that NAT is not enabled. |

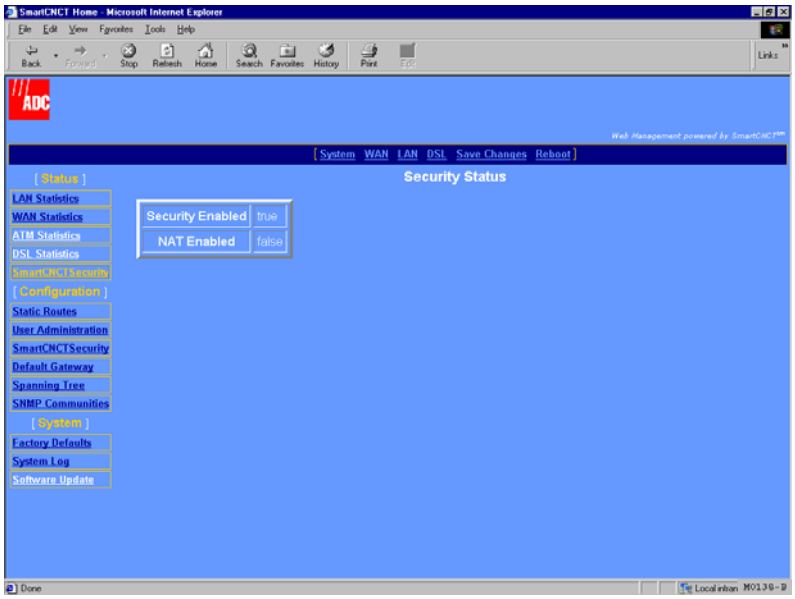
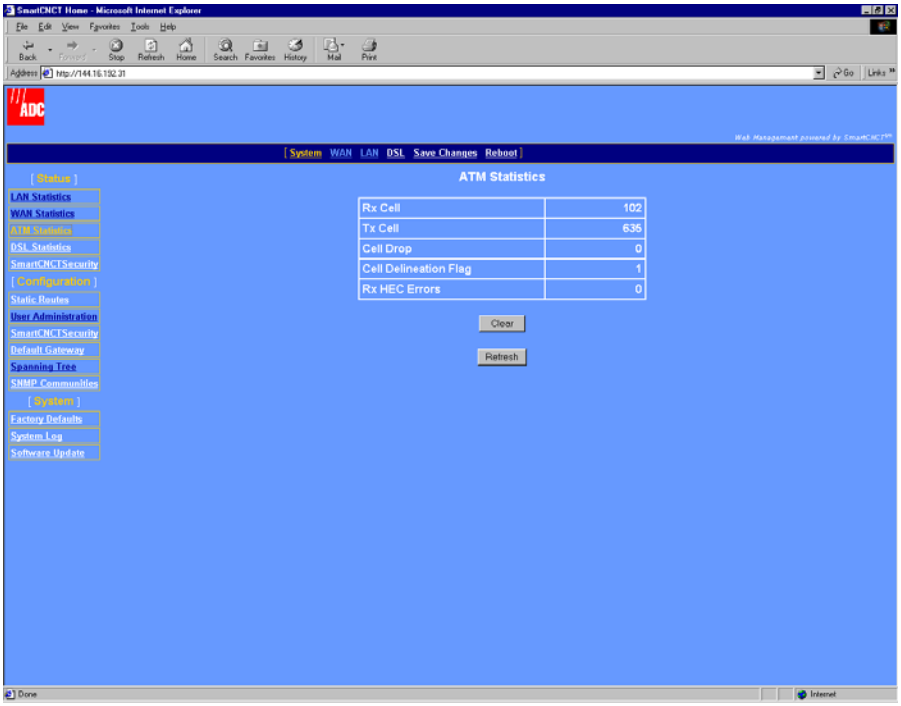



**Figure 9-5. Security Status**

## VIEW ATM STATISTICS

The ATM Statistics page provides information about the cells that are transmitted on the ATM layer.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **ATM Statistics** under **Status** to access the ATM Statistics page (Figure 9-6).<br>  <br><br>**Figure 9-6. ATM Statistics** |
| 2 | View the current statistics as described below.<br>• **Rx Cell**<br>Indicates the total number of cells received by the modem on the DSL interface.<br>• **Tx Cell**<br>Indicates the total number of cells transmitted by the modem over the DSL interface.<br>• **Cell Drop**<br>Indicates the total number of cells dropped by the modem.<br>• **Cell Delineation Flag**<br>Indicates if cell delineation errors have occurred on the modem. A 0 indicates that no errors have occurred A 1 indicates that errors have occurred.<br>• **Rx HEC Errors**<br>Indicates the total number of received ATM cells marked with uncorrectable header errors as indicated in the header-error control (HEC) byte. |
| 3 | Click one of the following, if appropriate:<br>• **Clear**—resets all the counters to zero.<br>• **Refresh**—updates the page with more current error counts. |

# VIEW DSL STATISTICS

The DSL statistics provides link statistics as well as error counter values for the modem. This data provides information for managing and troubleshooting the DSL transmission.

## View G.shdsl Link Statistics

Use the information about the G.shdsl transmission on the Link Statistics page for troubleshooting and monitoring.

| Step | Action |
|---|---|
| 1 | Select **System** on the menu bar, then select **DSL Statistics** under **Status** to access the Link Statistics page (Figure 9-7). |

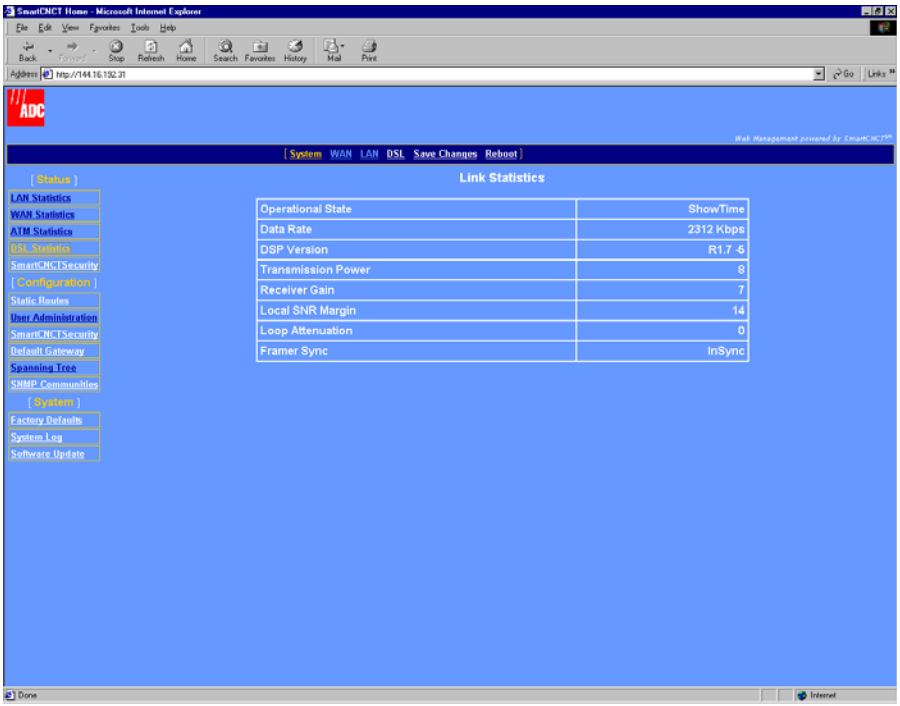



**Figure 9-7. Link Statistics**

| Step | Action |
|---|---|
| 2 | View the current statistics as described below:<br>• **Operational State**<br>Indicates the current mode of the modem. Operational states include:<br>– **Handshaking**—indicates that the modem is negotiating with the DSLAM or the other modem.<br>– **Training**—indicates that the modem is learning the connection parameters.<br>– **Show time**—indicates the G.shdsl connection is operational.<br>• **Data Rate**<br>Indicates the bit rate for this transmission on the G.shdsl connection.<br>• **DSP Version**<br>Indicates the version of G.shdsl firmware driver used on this modem.<br>• **Transmission Power**<br>Indicates the local transmission power in decibels.<br>• **Receiver Gain**<br>Indicates the amplifying factor for incoming signal in decibels.<br>• **Local SNR Margin**<br>Indicates the actual value for the SNR margin.<br>• **Loop Attenuation**<br>Indicates the current and approximate loop attenuation (loop signal loss) in decibels.<br>• **Framer Sync**<br>Indicates the current status of G.shdsl frame synchronization. |

## View G.shdsl Error Counters

Use the statistics on the G.SHDSL Error Counters page for troubleshooting and monitoring G.shdsl transmission.

| Step | Action |
|---|---|
| 1 | Select **DSL** on the menu bar, then select **Error Counters** under **DSL Options** to access the G.SHDSL Error Counters page (Figure 9-8). |
| 2 | View the current statistics as described below:<br>• **CRC Errors**<br>Indicates the total number of cyclic redundancy check (CRC) errors that have occurred on the G.shdsl connection since the last time that the G.shdsl error counters were cleared. CRC is an error checking technique used to ensure the integrity of data during transmission.<br>• **LOSW Errors**<br>Indicates the total number of loss of sync word (LOSW) defects that have occurred since the last time that the G.shdsl error counters were cleared. An LOSW is indicated when three or more consecutive frames contain one or more bit errors in the frame sync word.<br>• **Errored Seconds**<br>Indicates the total number of seconds in which one or more CRC errors occurred since the last time that the G.shdsl error counters were cleared.<br>• **Severely Errored Seconds**<br>Indicates the total number of seconds in which 50 or more CRC errors occurred since the last time that the G.shdsl error counters were cleared.<br>• **Unavailable Seconds**<br>Indicates the total number of seconds that the G.shdsl connection has been non-operational due to loss of synchronization or excessive errors since the last time that the G.shdsl error counters were cleared. |

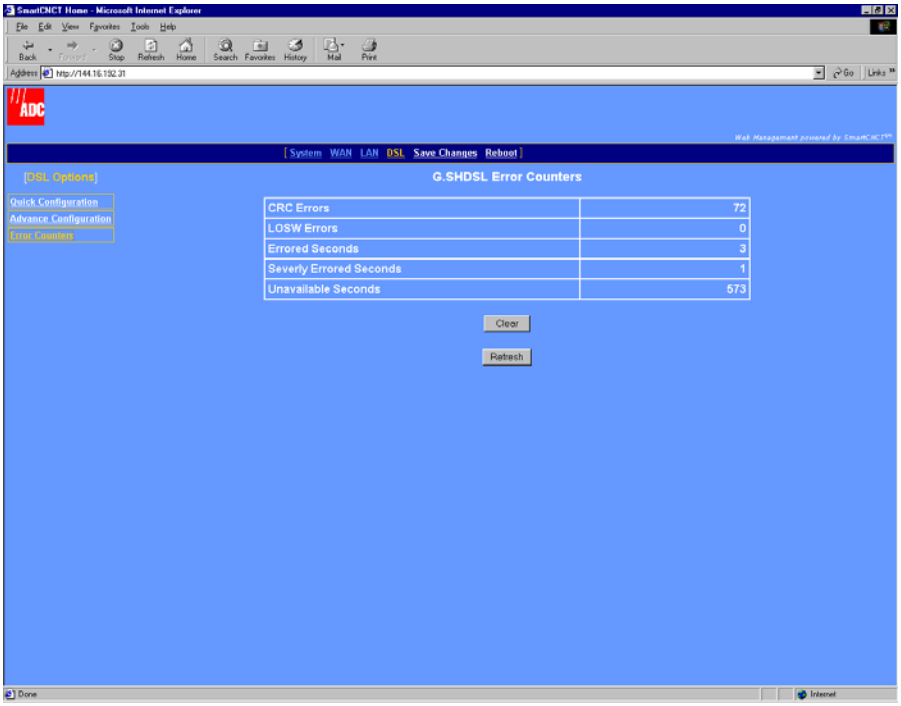



**Figure 9-8. G.SHDSL Error Counters**

| Step | Action |
|---|---|
| 3 | Click one of the following:<br>• **Clear**—resets all the counters to zero.<br>• **Refresh**—updates the page with current error counts. |

## MANAGE SOFTWARE AND CONFIGURATION

### Update System Software

Using the Web interface HTTP Upgrade capability, you can upgrade the software image (.tar). To complete an upgrade, specify the IP address of a server on the LAN side of modem where the new firmware is stored.

***IMPORTANT***

***The software update process takes about 90 seconds to complete and after the update the modem resets itself. Do not recycle the power during this process. This will cause permanent image corruption.***

***It is strongly recommended that you use this procedure to upgrade software.***

| Step | Action |
|---|---|
| 1 | Click **System** on the menu bar, then **Software Update** under **System** to access the Software Update page (Figure 9-9). |
| 2 | Click **Browse**, locate the server on the LAN where the firmware image or configuration file is located, then click **Open**. |
| 3 | Click **Upload** to start the file transfer to the modem.<br><br>***IMPORTANT***<br>***Do not power cycle the modem when the software update is in progress. Wait for the "Flash Update Complete" message before power cycling the modem.*** |

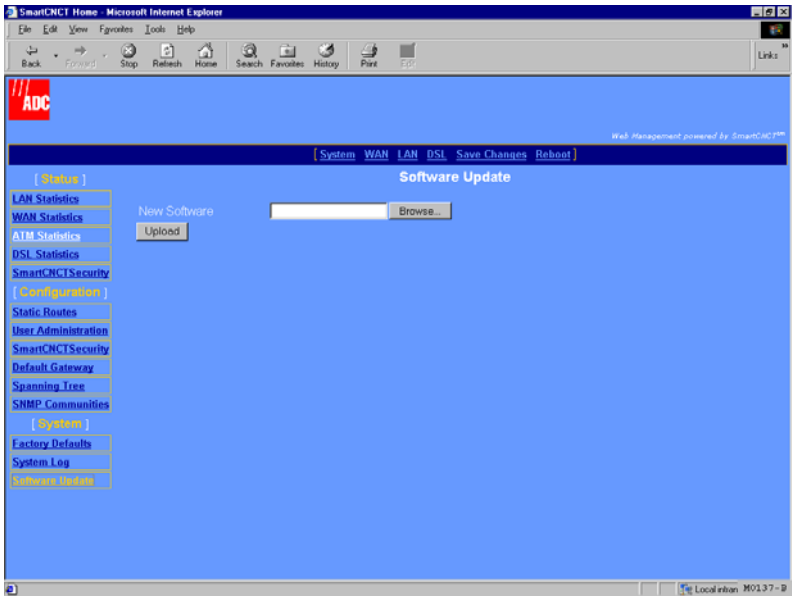
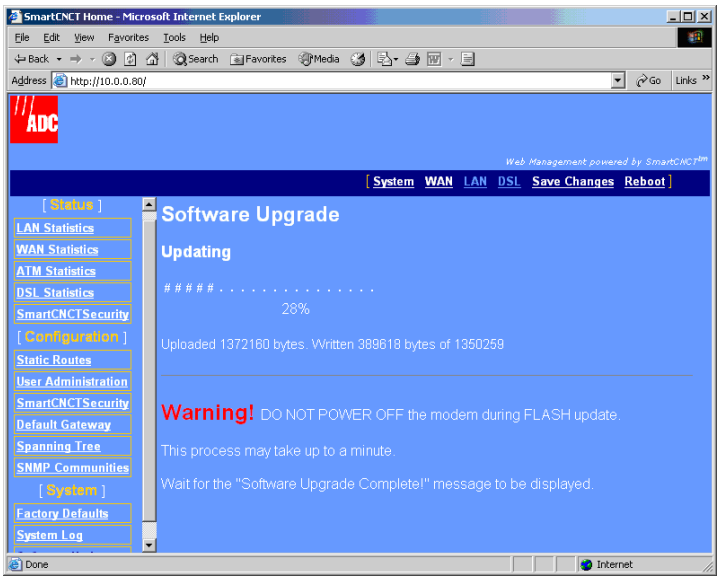
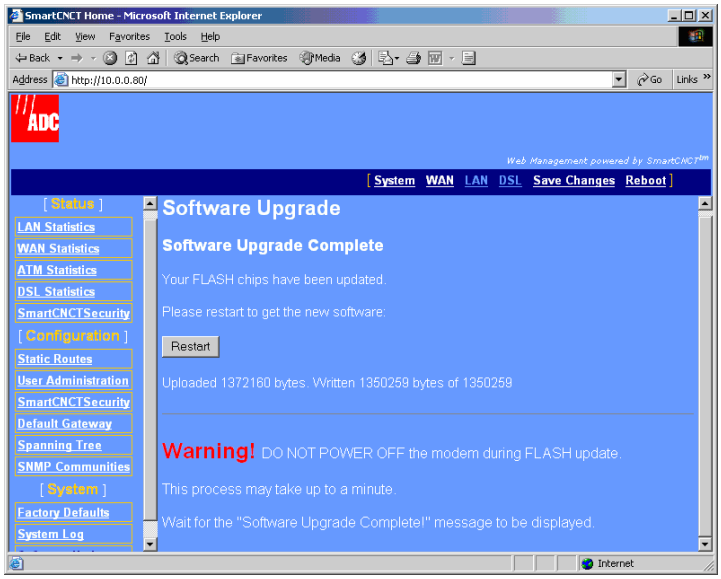



**Figure 9-9. Software Update**

| Step | Action |
|---|---|
| 4 | Click **Update Flash** when prompted.<br>  <br>**Figure 9-10. Updating Flash** |
| 5 | Click **Restart** when prompted.<br>  <br>**Figure 9-11. Software Upgrade Complete** |

## Reset to Factory Defaults

When you configure the modem, you change the factory default settings to new values. You can return these parameters to their default values to provide a known starting point if you are troubleshooting or if you simply want to configure new parameters. For session default values, see “Default Session Parameter Values” on page B-4.

There are three ways to reset the modem to its factory default values:

- Using the Web Interface (below)

- Using the modem's Reset button (see "Reset to Factory Defaults using the Reset Button" on page 9-14)
- Using the Command Line Interface (see "Restoring Factory Defaults" on page A-27)

***IMPORTANT***

***Active links are lost when you reset to factory default values.***

## Reset to Factory Defaults using the Web Interface

| Step | Action |
|---|---|
| 1 | Click **System** on the menu bar, then **Factory Defaults** under **System Options** to access the System Factory Defaults page (Figure 9-12). |
| 2 | Click **Proceed** if you want to return all modem parameters to their original factory values. Click **Cancel** if you do not want to return all modem parameters to their original factory values. |

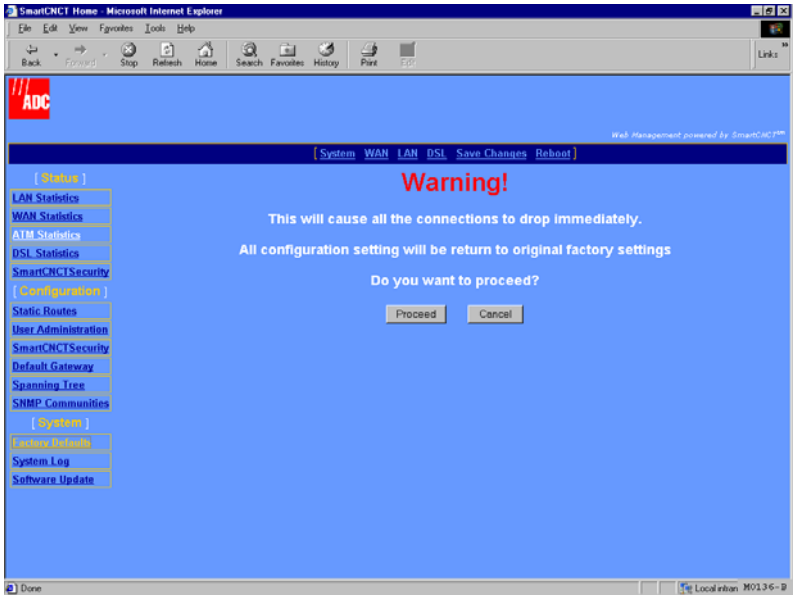



**Figure 9-12. Restore Factory Defaults—Web Interface**

## Reset to Factory Defaults using the Reset Button

1 Locate the **Reset** button on the modem's rear panel (see Figure 1-3 on page 1-4).

2 Use the tip of an unfolded paper clip (or similar object without a sharp tip) to gently press the Reset button (see Figure 9-13). Hold down on the button for more than 5 seconds to restore all factory default settings.

***IMPORTANT***

***Holding down on the Reset button for LESS than 5 seconds causes the modem to reboot. For detailed information about rebooting your modem:***

- ***Using the reset button on the back panel of the modem, see "Rebooting the Modem with the Reset Button" on page 1-6.***
- ***Using the Web Interface, see "Reset to Factory Defaults using the Web Interface" on page 9-13.***
- ***Using the Command Line Interface, see "Restoring Factory Defaults" on page A-27.***

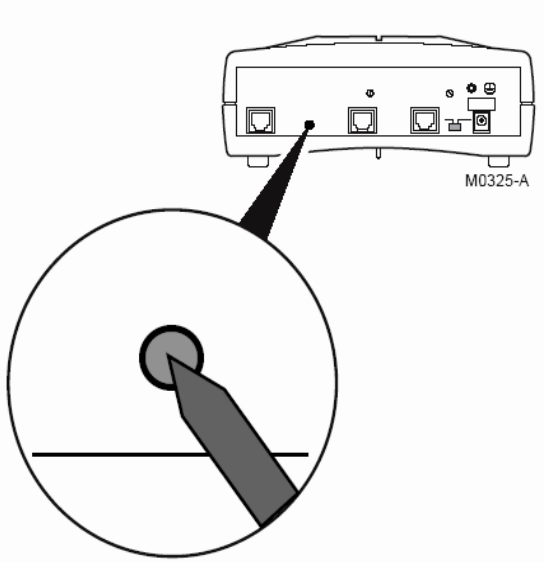



**Figure 9-13. Restore Factory Defaults—Reset Button**

**NOTE:** After uploading code V3.2.0 to the modem using HTTP, perform Factory Defaults using the Reset Button.

# Appendix A

## COMMAND LINE INTERFACE ACCESS

You can manage the modem using either the command line interface or the Web interface. Access to the command line interface is accomplished by either direct connection to the modem console port or through a telnet session (over a network).

This section provides instructions for accessing and using the command line interface. Access to the Web interface is accomplished through a Web browser using an internet connection. Chapter 2: Accessing the Web Interface for Modem Management provides instructions on accessing and using the Web interface for management.

The Web interface is the more comprehensive of the two management interfaces and generally simpler to use. There are situations, however, in which using the command line interface is preferable to using the Web interface. For example, if you cannot connect to the modem through the DSL line and 10/100Base-T port, you can still manage the modem through the console port.

The following sections describe how to use the command line interface:

## CONNECT TO THE CONSOLE PORT

| Step | Action |
|---|---|
| 1 | Install the flat gray console cable between the modem Console port and your PC (see Figure A-1), using the DB-9 port adapter on the PC, if required. |

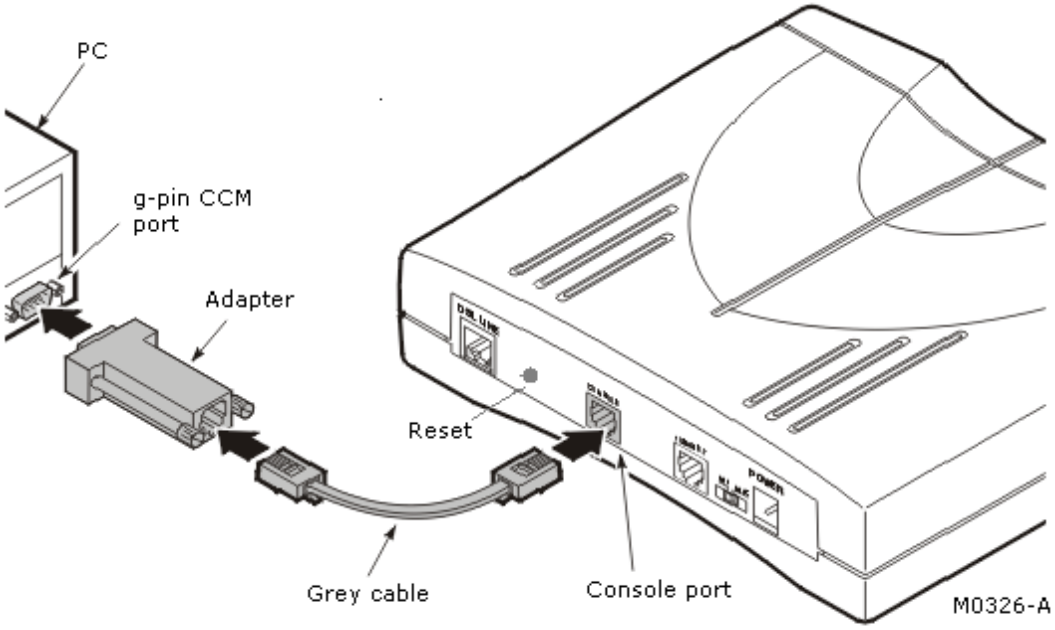



**Figure A-1. Connect to the Console Port**

### Access the Command Line Interface

You can access the command line interface through the direct connection to the modem console port using a terminal emulation program. You can also access the command line interface using a telnet session. To use a telnet session, you must have IP access to the modem either through the 10/100Base-T LAN port (LAN-side access) or through an IP address assigned to a WAN session (WAN-side access). The following sections provide instructions for setting up both types of command line interface access.

### Access through the Console Port

Access the terminal emulation program (HyperTerminal, Teraterm, ProComm) to establish a connection to the modem command line interface. The following procedure uses HyperTerminal as the example terminal emulation program. If you are using another terminal emulation program, refer to the user documentation for instructions.

| Step | Action |
|---|---|
| 1 | From the **Start** button, select **Programs \| Accessories \| HyperTerminal**. |
| 2 | In the HyperTerminal dialog, select **File \| New Connection**. |
| 3 | Enter a name for this connection and click **OK**. |
| 4 | For **Connect using**, select the COM port (typically COM1) on the PC to which you have connected the modem (console port connection), then click **OK**. The COM1 Properties dialog (Figure A-2) is displayed. |

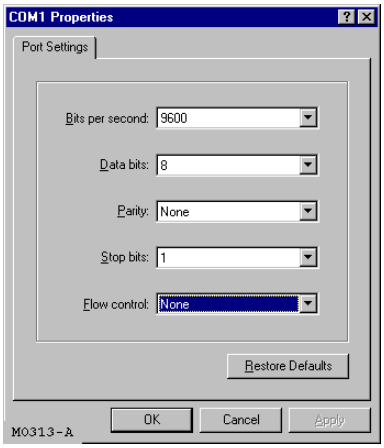
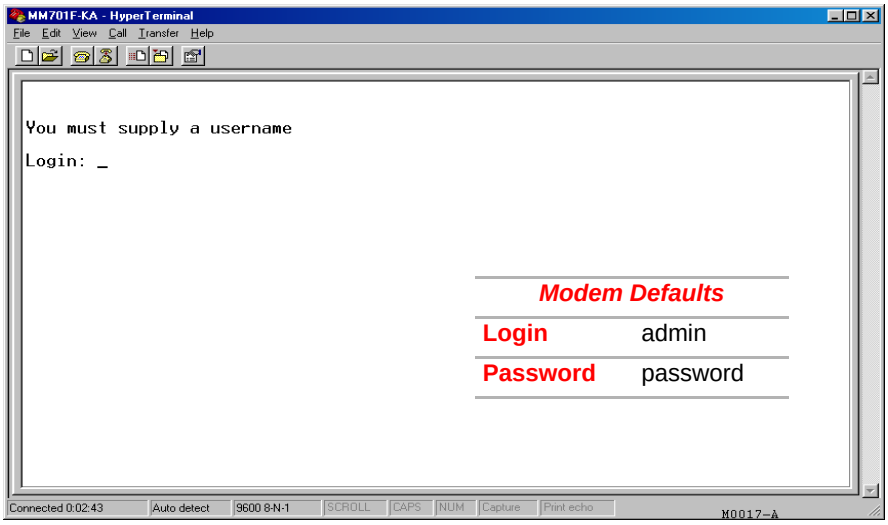
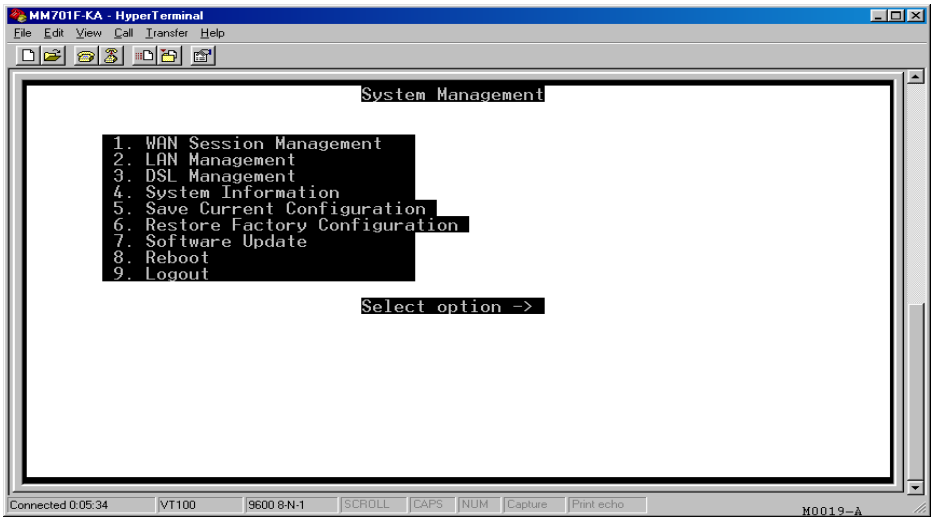



**Figure A-2. COM1 Properties**

| Step | Action |
|---|---|
| 5 | In the COM1 Properties dialog, enter the Port Settings as follows:<br>• 9600 baud<br>• 8 data bits<br>• no parity<br>• 1 stop bit<br>• flow control off (none) |
| 6 | Click **OK**. |
| 7 | Press **ENTER**. A prompt will be displayed (see Figure A-3); enter your login and password.<br>  <br>**Figure A-3. Login Prompt**<br>The System Management main menu is displayed (Figure A-4).<br>  <br>**Figure A-4. System Management Main Menu**<br>Type the number and press **ENTER** to access the configuration menu for each parameter (WAN Session Management or LAN Management, for example). Press **ENTER** (<CR>) at the prompt to return to a higher-level menu. |

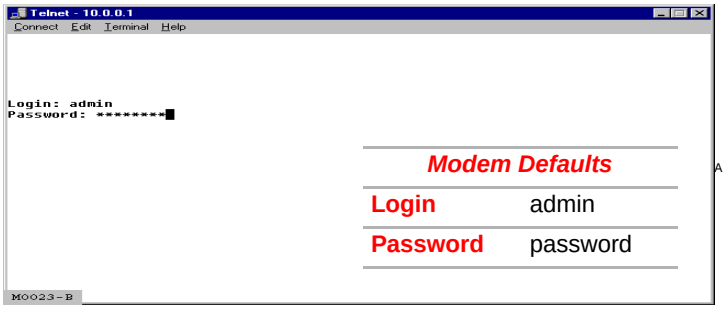
## ACCESS THROUGH A TELNET SESSION

To access the modem through a LAN-side telnet session, make sure the management PC is on the same IP subnet as the modem (see "Accessing the Web Interface for Modem Management" on page 2-1); you will specify the LAN port IP address (default LAN IP address is *10.0.0.1* and subnet mask is *255.255.255.0*) for access. To access the modem through a WAN-side telnet session, make sure at least one WAN session has been set up for the modem; you will specify the IP address set up for that WAN session for access.

***IMPORTANT***

***Although you can have concurrent telnet and console port sessions to the command line interface, you can make changes through only one of the interfaces at a time.***

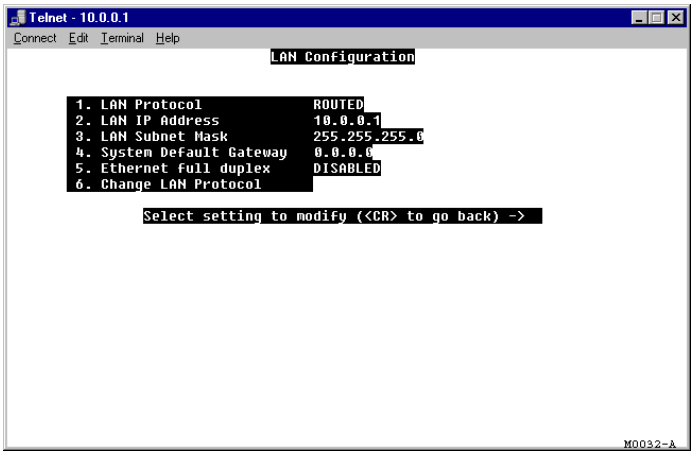
Below is an example using the telnet application in Microsoft Windows to access the modem command line interface:

| Step | Action |
|---|---|
| 1 | From the **Start** button, select **Run** to display the Run dialog. (Conversely, you can open your telnet application.) |
| 2 | In the Open box, enter the telnet command and the modem IP address (for example, **`10.0.0.1`**), then click **OK**. The Windows telnet dialog is displayed (Figure A-5).   **Figure A-5. Windows Telnet** |
| 3 | At the prompt, enter your **Login** and **Password**. The System Management main menu is displayed. |

## Set Up the LAN

If you are operating in Router mode and in a LAN environment, then you also need to set your LAN protocol, Ethernet Port IP address, and subnet mask.

If you prefer, you may use the default values of *10.0.0.1* for the Ethernet Port IP Address, and *255.255.255.0* for the subnet mask.

| Step | Action |
|---|---|
| 1 | From the System Management main menu (Figure A-4 on page A-4), enter **2** to display the LAN Configuration menu (Figure A-6).<br>  <br>**Figure A-6. LAN Configuration**<br>**NOTE**: The LAN Protocol can only be changed through the Command Line Interface. |

| Step | Action |
|---|---|
| 2 | Configure the following parameters, 1 through 6, for the PPP session:<br>• **LAN Protocol**<br>Enter **1** then select one of the following for DHCP protocol:<br>**1**—Spanning Tree where you select *1* to Disable spanning tree protocol or select *2* to Enable spanning tree protocol for all bridging sessions.<br>  **Note:** If a DHCP server is not set up and active on your LAN, do not enable DHCP client. DHCP Client mode is recommended for use only when bridging is used as the LAN protocol.<br>**2**—DHCP Client mode where you select *1* to Disable DHCP client mode or select *2* to Enable DHCP client mode for the modem.<br>• **LAN IP Address**<br>Enter **2** then type the IP address provided by your LAN administrator. Use the following criteria to determine if or how the LAN IP address will be changed:<br>– Enter an IP address for the LAN (10/100Base-T) port provided by the LAN administrator if you are not implementing a 10.0.0.0 subnet.<br>– Use the default IP address for the LAN port which is 10.0.0.1. If you choose to use the default IP address, make sure the devices on your LAN are on the same subnet as this modem LAN port.<br>– If you want a DHCP server on your LAN to automatically provide the modem LAN port IP address, select **Client** for the DHCP configuration.<br>• **LAN Subnet Mask**<br>Enter **3** then type the LAN subnet mask provided by your LAN administrator. Use the following criteria to determine if or how the LAN subnet mask will be changed:<br>– Enter the subnet mask for the LAN (10/100Base-T) port provided by the LAN administrator.<br>– Use the default subnet mask for the LAN port which is 255.255.255.0. If you choose to use the default subnet mask, ensure that it allows devices on your LAN to access the modem LAN port.<br>– If you want a DHCP server on your LAN to automatically provide the subnet mask in addition to the IP address, select Client for the DHCP configuration.<br>• **System Default Gateway**<br>Enter **4** then type the IP address of the default gateway. This IP Address is the default gateway for the modem.<br>• **Ethernet Mode**<br>The default is Auto Negotiation. Mode: Enabled.<br>• **Change LAN Protocol**<br>Enter **6** then select one of the following to change the LAN Protocol:<br>**1**—Bridging protocol<br>**2**—Routing protocol |
| 3 | Select **Save Current configuration** from the Main Menu as described in “Saving the Current Configuration” on page A-28 or the changes will be lost upon reboot or power cycle. |

## MANAGE WAN SESSIONS

From the System Management main menu (Figure A-4 on page A-4), enter **1** to display the WAN Session Management menu (Figure A-7). The WAN Session Management screen displays the available options.

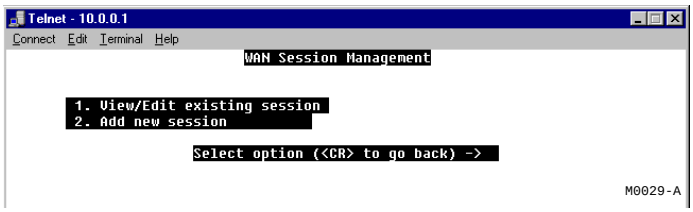



**Figure A-7. WAN Session Management**

A total of 32 WAN sessions can be created using the protocols listed below. Make sure, however, that you do not exceed the maximum limit per protocol type as shown below:

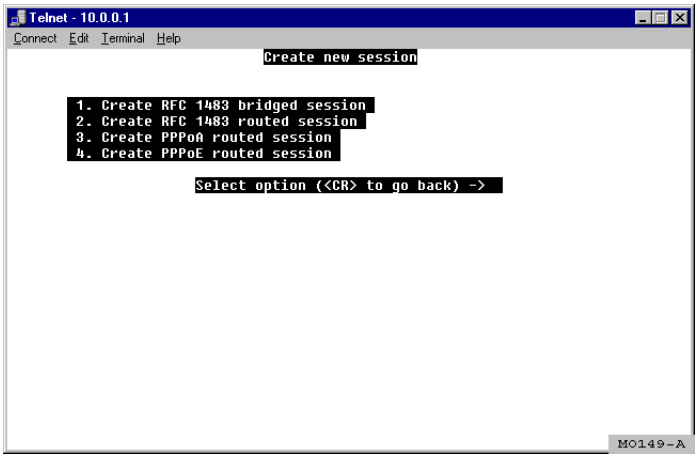
- RFC 1483-Bridge (up to 8 sessions)
- RFC 1483-Router (up to 16 sessions)
- PPPoA or PPPoE (up to 8 sessions for either type)

F4 and F5 OAM are enabled on default PVCs (0/35 and 0/100) and on every new PVC that is created.

**Note:** The modem is shipped with factory defaults as a Remote modem.

With V3.2.0, there are two RFC-1483 WAN Bridging sessions with PVC's 0/35 and 0/100. For point-to-point LAN extension applications, delete one WAN session.

### Add a New Session

| Step | Action |
|---|---|
| 1 | On the WAN Session Management menu, enter **2** to add a new session. The Create new session menu is displayed (Figure A-8).<br>  <br>**Figure A-8. Create New Session** |
| 2 | Select one of the following protocols for this session:<br>**1**—Create RFC 1483 bridged session if the modem forwards packets based on MAC addresses. You can enable Spanning Tree when you select Bridge sessions. See "Change Spanning Tree Setting" on page 5-10.<br>**2**—Create RFC 1483 routed session if the modem routes packets based on IP addresses.<br>**3**—Create PPPoA routed session if the modem establishes PPP sessions over ATM with the service provider and routes packets based on IP addresses.<br>**4**—Create PPPoE routed session if modem establishes PPP sessions over Ethernet with the service provider and routes packets based on IP addresses. |

### Set Up an RFC 1483 Bridged Session

You selected **Create RFC 1483 bridged session** from the WAN Session Management menu (see Figure A-7 on page A-8) to display the following menu.

| Step | Action |
|---|---|
| 1 | Configure the following parameters, 1 through 8, for the bridging session:<br>• **Session Name**<br>Enter 1 then type a unique, descriptive identifier for the session. This name can have a maximum of 32 characters.<br>• **Virtual Path ID (VPI)**<br>Enter 2 then type the value (from 0 to 4,095) provided by the service provider. The number identifies the virtual path that transports ATM cells between the modem and the service provider. This value must match the virtual path identification (VPI) value the service provider uses for this connection.<br>• **Virtual Channel ID (VCI)**<br>Enter 3 then type the value (from 32 to 65,535) provided by the service provider. The number identifies the virtual channel for this session that transports ATM cells between the modem and the service provider. This value must match the virtual channel identification (VCI) value the service provider uses for this connection.<br>• **QoS Class**<br>Enter **4** then select the ATM Quality of Service indicated by your service provider. The options are:<br>**1**—CBR (constant bit rate)<br>**2**—VBR-rt (variable bit rate real-time)<br>**3**—VBR-nrt (variable bit rate non-real-time)<br>**4**—UBR (unspecified bit rate is the default setting)<br>• **Peak Cell Rate**<br>Enter **5** then type the QoS Peak Cell Rate (PCR) value supplied by your service provider. If you are not provided a PCR value, use the default. PCR is the maximum rate at which data is transferred on the line and measured in ATM cells per second. The valid range is 1-5500 cells per second for MM701G2 and 1-11000 cells per second for MM702G2. The default PCR is 5500.<br>• **Sustain Cell Rate**<br>Enter **6** then type the QoS Sustainable Cell Rate (SCR) value supplied by your service provider. Use for CBR, VBR-rt, and VBR-nrt ATM QoS. SCR is the average rate at which ATM cells are transferred, measured in cells per second. The SCR must be less than the PCR. The valid range is 1-5500 cells per second.<br>• **Maximum burst size**<br>Enter **7** then type the QoS Maximum Burst Size (MBS) value supplied by your service provider. Use with VBR-rt and VBR-nrt QoS. MBS is the maximum number of cells that can be transmitted at the peak cell rate. The MBS rate must be equal to or less than the PCR. The default MBS is 0.<br>• **Encapsulation**<br>Enter **8** then select the encapsulation type as indicated by the service provider. The options are:<br>**1**—Llc Encapsulation (Logical Link Control) allows multiple protocols to be run over the session. This is the default encapsulation.<br>**2**—Vcmux Encapsulation (Virtual Channel Multiplexer) encapsulation allows one protocol to be run over the session. |
| 2 | Enter **9** to Apply the new setting and add the new RFC1483 bridged session to your session list; or, you can enter **10** to Delete session. |

## Set Up an RFC 1483 Routed Session

You selected **Create RFC 1483 routed session** from the WAN Session Management menu (see Figure A-7 on page A-8) to display the following menu.

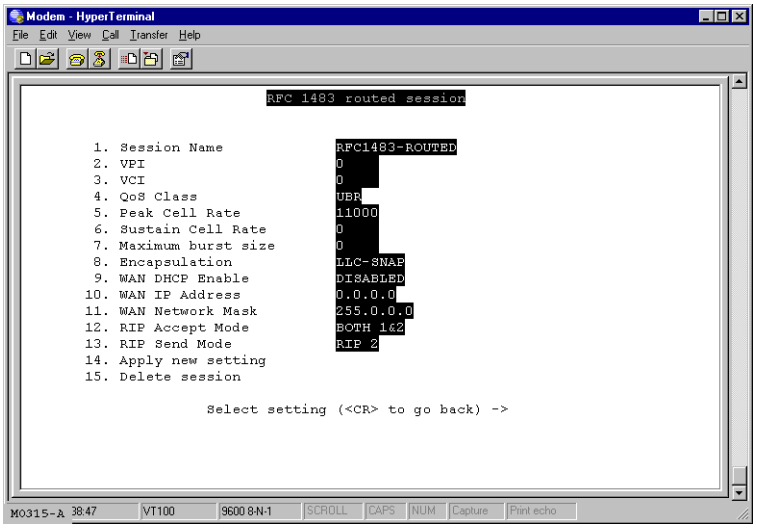



**Figure A-9. RFC 1433 Routed Session**

| Step | Action |
|---|---|
| 1 | Configure the following parameters, 1 through 13, for the routing session:<br>• **Session Name**<br>Enter **1** then type a unique, descriptive identifier for the session. This name can have a maximum of 32 characters.<br>• **Virtual Path ID (VPI)**<br>Enter **2** then type the value (from 0 to 4,095) provided by the service provider. The number identifies the virtual path that transports ATM cells between the modem and the service provider. This value must match the virtual path identification (VPI) value the service provider uses for this connection.<br>• **Virtual Channel ID (VCI)**<br>Enter **3** then type the value (from 32 to 65,535) provided by the service provider. The number identifies the virtual channel for this session that transports ATM cells between the modem and the service provider. This value must match the virtual channel identification (VCI) value the service provider uses for this connection.<br>• **QoS Class**<br>Enter **4** then select the ATM Quality of Service indicated by your service provider. The options are:<br>**1**—CBR (constant bit rate)<br>**2**—VBR-rt (variable bit rate real-time)<br>**3**—VBR-nrt (variable bit rate non-real-time)<br>**4**—UBR (unspecified bit rate is the default setting)<br>• **Peak Cell Rate**<br>Enter **5** then type the QoS Peak Cell Rate (PCR) value supplied by your service provider. If you are not provided a PCR value, use the default. PCR is the maximum rate at which data is transferred on the line and measured in ATM cells per second. The valid range is 1-5500 cells per second for MM701G2 and 1-11000 cells per second for MM702G2. The default PCR is 5500. |

| Step | Action |
|---|---|
| 1 (cont.) | • **Sustain Cell Rate**<br>Enter **6** then type the QoS Sustainable Cell Rate (SCR) value supplied by your service provider. Use for CBR, VBR-rt, and VBR-nrt ATM QoS. SCR is the average rate at which ATM cells are transferred, measured in cells per second. The SCR must be less than the PCR. The valid range is 1-5500 cells per second.<br>• **Maximum burst size**<br>Enter **7** then type the QoS Maximum Burst Size (MBS) value supplied by your service provider. Use with VBR-rt and VBR-nrt QoS. MBS is the maximum number of cells that can be transmitted at the peak cell rate. The MBS rate must be equal to or less than the PCR. The default MBS is 0.<br>• **Encapsulation**<br>Type **8** then select the encapsulation type as indicated by the service provider. The options are:<br>**1**—Llc Encapsulation (Logical Link Control) allows multiple protocols to be run over the session. This is the default encapsulation.<br>**2**—Vcmux (Virtual Channel Multiplexer) encapsulation allows one protocol to be run over the session.<br>• **WAN DHCP Enable**<br>Type **9** then select *1* to Disable or *2* to Enable DHCP client. Enabling DHCP client provides the capability where this session will automatically received an IP address from the service provider via a DHCP server. If you enable DHCP client, leave the next two fields, WAN IP address and WAN Network Mask, blank. These fields will automatically receive values.<br>• **WAN IP Address**<br>Type **10** then enter the IP address provided by the service provider for this session unless you have enabled WAN DHCP. The default IP address is 0.0.0.0.<br>• **WAN Network Mask**<br>Type **11** then enter the network mask provided by the service provider for this session unless you have enabled WAN DHCP. The default WAN Network Mask is 0.0.0.0.<br>• **RIP Accept Mode**<br>Type **12** then select one of the following:<br>**1**—No RIP<br>**2**—RIP Version 1<br>**3**—RIP Version 2<br>**4**—RIP Version 1 & 2 (default)<br>• **RIP Send Mode**<br>Type **13** then select one of the following:<br>**1**—No RIP<br>**2**—RIP Version 1<br>**3**—RIP Version 2 (default)<br>**4**—RIP Version 1 & 2 |
| 2 | Enter **14** to Apply the new setting and to add the new RFC1483 routed session to your session list; or you can enter **15** to Delete session. |

## Set Up a PPPoA or PPPoE Routed Session

You selected **Create PPPoA routed session** or **Create PPPoE routed session** from the WAN Session Management menu (Figure A-7 on page A-8) to display the following menu. The PPPoA routed session configuration is shown below as an example. The configuration parameters for PPPoE routed session are identical.

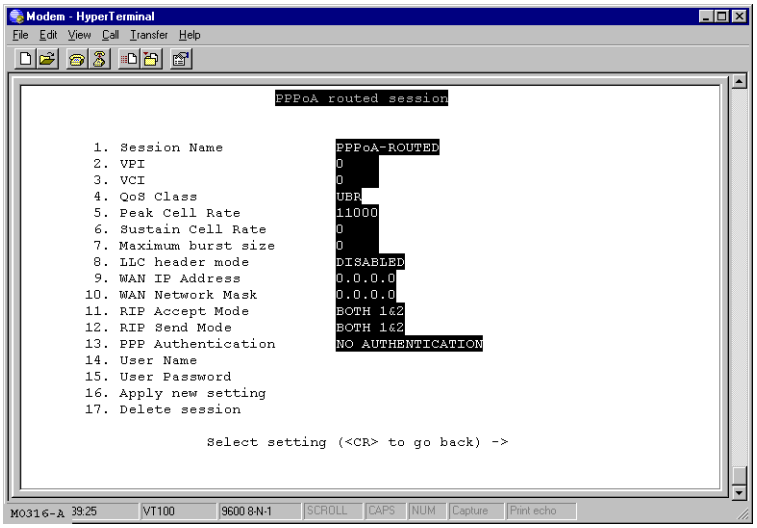



**Figure A-10. PPPoA Routed Session**

| Step | Action |
|---|---|
| 1 | Configure the following parameters, 1 through 15, for the PPP session:<br>• **Session Name**<br>Enter **1** then type a unique, descriptive identifier for the session. This name can have a maximum of 32 characters.<br>• **Virtual Path ID (VPI)**<br>Enter **2** then type the value (from 0 to 4,095) provided by the service provider. The number identifies the virtual path that transports ATM cells between the modem and the service provider. This value must match the virtual path identification (VPI) value the service provider uses for this connection.<br>• **Virtual Channel ID (VCI)**<br>Enter **3** then type the value (from 32 to 65,535) provided by the service provider. The number identifies the virtual channel for this session that transports ATM cells between the modem and the service provider. This value must match the virtual channel identification (VCI) value the service provider uses for this connection.<br>• **QoS Class**<br>Enter **4** then select the ATM Quality of Service indicated by your service provider. The options are:<br>**1**—CBR (constant bit rate)<br>**2**—VBR-rt (variable bit rate real-time)<br>**3**—VBR-nrt (variable bit rate non-real-time)<br>**4**—UBR (unspecified bit rate is the default setting) |

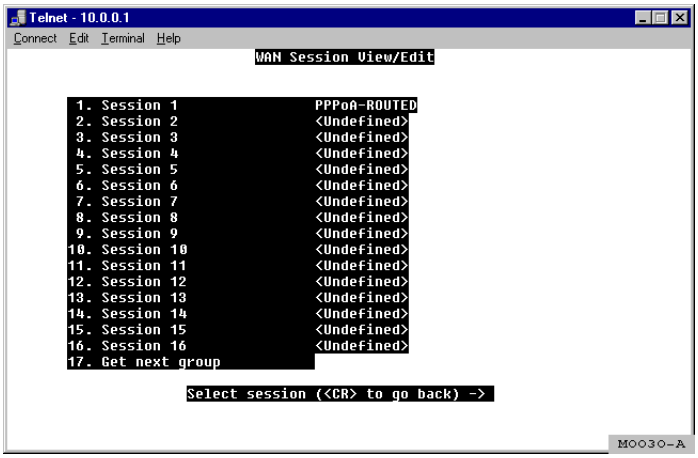
| Step | Action |
|---|---|
| 1 (cont.) | • **Peak Cell Rate**<br>Enter **5** then type the QoS Peak Cell Rate (PCR) value supplied by your service provider. If you are not provided a PCR value, use the default. PCR is the maximum rate at which data is transferred on the line and measured in ATM cells per second. The valid range is 1-5500 cells per second. The default PCR is 5500.<br>• **Sustain Cell Rate**<br>Enter **6** then type the QoS Sustainable Cell Rate (SCR) value supplied by your service provider. Use for CBR, VBR-rt, and VBR-nrt ATM QoS. SCR is the average rate at which ATM cells are transferred, measured in cells per second. The SCR must be less than the PCR. The valid range is 1-5500 cells per second.<br>• **Maximum burst size**<br>Enter **7** then type the QoS Maximum Burst Size (MBS) value supplied by your service provider. Use with VBR-rt and VBR-nrt QoS. MBS is the maximum number of cells that can be transmitted at the peak cell rate. The MBS rate must be equal to or less than the PCR. The default MBS is 0.<br>• **LLC header mode**<br>Enter **8** then select either *1* to Enabled or *2* to Disabled the LLC header. The default is Disabled. Disabled indicates that VCMux encapsulation is used. Enabled indicates that LLC/Snap encapsulation is used.<br>• **WAN IP Address**<br>Enter **9** then type the IP address is dynamically served by the service provider for this session. When the modem has received the IP address for this session, it displays the value in this field. Also, the IP address dynamically received for the first PPP session set up is assigned as the default gateway. The default is 0.0.0.0.<br>If the service provider does not dynamically provide an IP address, they can give you a static IP address that you can enter in this field.<br>• **WAN Network Mask**<br>Enter **10** then type the subnet mask is dynamically served by the service provider for this session. The default subnet mask for the session is 0.0.0.0.<br>If the service provider does not dynamically provide a subnet mask, they can give you a subnet mask value that you can enter in this field.<br>• **RIP Accept Mode**<br>Type **11** then select one of the following:<br>**1**—No RIP<br>**2**—RIP Version 1<br>**3**—RIP Version 2<br>**4**—RIP Version 1 & 2 (default)<br>• **RIP Send Mode**<br>Type **12** then select one of the following:<br>**1**—No RIP<br>**2**—RIP Version 1<br>**3**—RIP Version 2 (default)<br>**4**—RIP Version 1 & 2 |

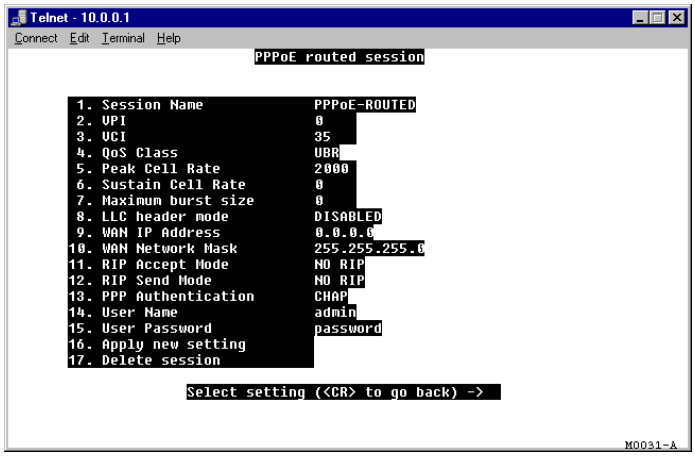
| Step | Action |
|---|---|
| 1 (cont.) | • **PPP Authentication**<br>Enter **13** then select the authentication protocol provided by your service provider for PPP sessions. The authentication protocol type must match at the modem and the service provider. The options are:<br>**1**—NO Authentication is required for the session.<br>**2**—PAP where the modem sends authentication requests to the service provider and authentication occurs only once during the life of the link.<br>**3**—CHAP where the service provider returns an authentication challenge to the modem during the authentication.<br>• **User Name**<br>Enter **14** then type the login name for this PPP session to the Login name supplied by the service provider. Minimum login name length is one character and the maximum is 32 characters.<br>• **User Password**<br>Enter **15** then type the login password for this PPP session to the Login password supplied by the service provider. Minimum password length is six characters and the maximum is 32 characters. |
| 2 | Enter **16** to Apply the new setting and to add the new RFC1483 bridged session to your session list; or you can enter **17** to Delete session. |

### Permanently Save Sessions

After you have set up all the WAN sessions, select **Save Current configuration** from the System Management main menu as described in "Saving the Current Configuration" on page A-28 or the changes will be lost if you reboot or power cycle the modem.

### Edit an Existing Session

| Step | Action |
|---|---|
| 1 | On the WAN Session Management menu (Figure A-7 on page A-8), enter **1** to View/Edit existing session. The WAN Session View/Edit screen is displayed (Figure A-11).<br>  <br>**Figure A-11. WAN Session View/Edit** |

| Step | Action |
|---|---|
| 2 | Enter the session number to display the session screen. (Figure A-12 below shows session 1, PPPoA-ROUTED.)<br>  <br>**Figure A-12. PPPoA Routed Session** |
| 3 | Change settings as appropriate. See these sections for detailed information about editing parameters for these protocols:<br>• "Set Up an RFC 1483 Bridged Session" on page A-10<br>• "Set Up an RFC 1483 Routed Session" on page A-11<br>• "Set Up a PPPoA or PPPoE Routed Session" on page A-13 |
| 4 | Select **Apply** new setting to immediately activate the changes that you have made for this session. |
| 5 | Select **Save Current configuration** from the Main Menu as described in "Saving the Current Configuration" on page A-28 or the changes will be lost upon reboot or power cycle. |

## MANAGE DSL

Use the DSL menu to set up and manage the G.shdslADSL transmission line. This menu allows you to:

- View the DSL configuration
- Configure the DSL line
- Monitor the DSL statistics

From the System Management main menu (Figure A-4 on page A-4), enter **3** to display the DSL Management menu (Figure A-13).

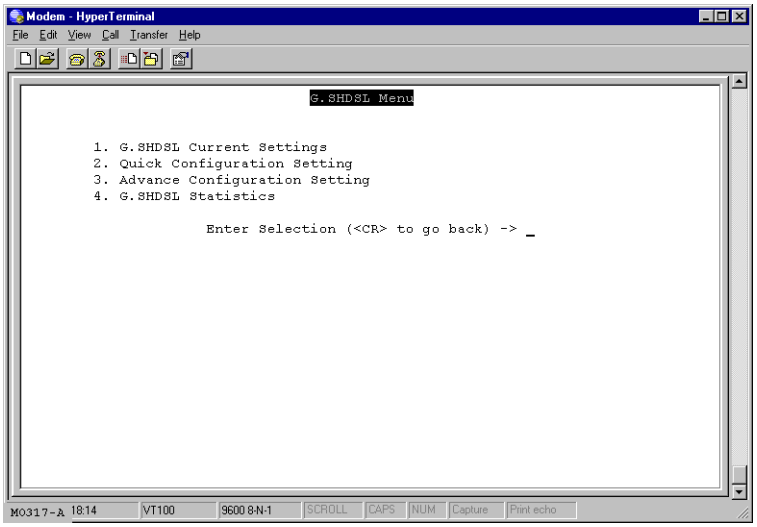



**Figure A-13. DSL Management Menu**

## Configure G.shdsl Parameters

You can complete either a quick configuration or an advanced configuration for the G.shdsl line parameters. The following sections provide procedures for each configuration type.

### Complete a Quick Configuration

| Step | Action |
|---|---|
| 1 | From the G.SHDSL Menu, enter **2** to display the G.SHDSL Quick Configuration menu (Figure A-14). |

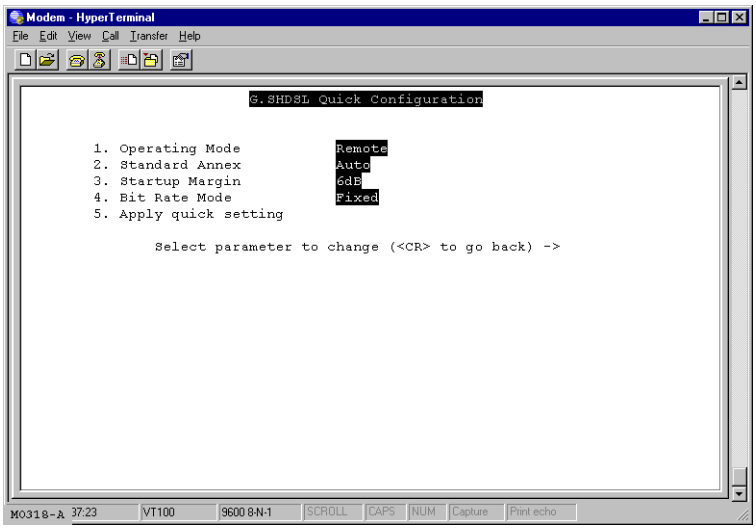
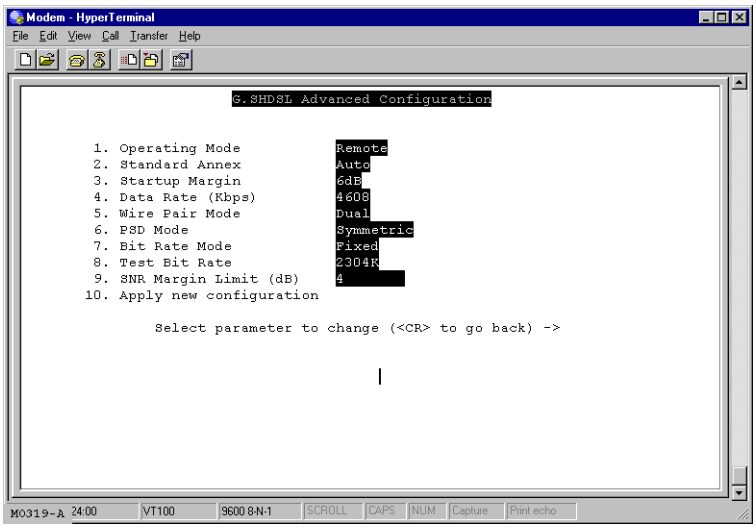



**Figure A-14. G.SHDSL Quick Configuration**

| Step | Action |
|---|---|
| 2 | Configure the following parameters as directed by your service provider:<br>• **Operating Mode**<br>Type **1** then select *1* for Remote and *2* for Central-Office.<br>When the modem is connected to a service provider through a DSLAM, the operating mode is Remote (default setting). When two modems are used in a point-to-point application (LAN extension, for example), one modem at the customer or user site is set to Remote, and the second modem in the CO or wiring closet is set to Central-Office. For instruction on setting up G.shdsl parameters and other related parameters for a point-to-point modem application, go to Chapter 7: Implementing a Point-To-Point LAN Extension.<br>• **Standard Annex**<br>Type **2** then select one of the following Annexes:<br>**1**—Annex-A for operating conditions typically found in the North American implementation of G.shdsl<br>**2**—Annex-B for operating conditions typically found in the European implementation of G.shdsl. This is the default mode for the MM701G2 modem.<br>**3**—Auto for automatically negotiating the Annex A or B standard by which this modem, and the device to which this modem is attached, can operate.<br>• **Startup Margin**<br>Type **3** then select a number from 1 to 21 for possible values between -10dB through 10dB, or select 22 to completely Disable the margin.The target signal-to-noise margin, in decibels, that the modem must achieve with a BER of $10^{-7}$ or better to successfully complete synchronization. The default margin value is -10 dB. A lower margin may result in a higher data rate, but it can increase noise on the line.<br>• **Bit Rate Mode**<br>Type **4** then select either 1 for Adaptive or 2 for Fixed mode. Bit rate mode indicates how the modem synchronizes with the device to which it is attached. The default for the modem is Adaptive mode. The following provides more description for each mode.<br>– **Fixed mode** indicates that the modem will synchronize with the other end (a DSLAM or another modem) at a fixed bit rate through negotiation. The modem will synchronize at the best rate, up to the data rate specified (page 124), that can be achieved by both ends.<br>– **Adaptive mode** indicates that prior to modem negotiating a rate, the modem performs an adaptation phase during which it determines a best possible rate based on conditions of the line. After adaptive mode, the modem will then negotiate the best rate that can be achieved with the other end, based on the adaptation results. |
| 3 | Type **5** to Apply the new configuration for the G.shdsl settings. |

## Complete an Advanced Configuration

| Step | Action |
|---|---|
| 1 | From the G.SHDSL Menu, enter **3** to display the G.SHDSL Advanced Configuration menu (Figure A-15).<br>  <br>**Figure A-15. G.SHDSL Advanced Configuration** |
| 2 | Configure the following parameters as directed by your service provider:<br>• **Operating Mode**<br>Type **1** then select *1* for Remote and *2* for Central-Office.<br>When the modem is connected to a service provider through a DSLAM, the operating mode is Remote (default setting). When two modems are used in a point-to-point application (LAN extension, for example), one modem at the customer or user site is set to Remote and the second modem in the CO or wiring closet is set to Central-Office. For instruction on setting up G.shdsl parameters and other related parameters for a point-to-point modem application, go to Chapter 7: Implementing a Point-To-Point LAN Extension.<br>• **Standard Annex**<br>Type **2** then select one of the following Annexes:<br>**1**—Annex-A for operating conditions typically found in the North American implementation of G.shdsl<br>**2**—Annex-B for operating conditions typically found in the European implementation of G.shdsl. This is the default mode for the modem.<br>**3**—Auto for automatically negotiating the Annex A or B standard by which this modem, and the device to which this modem is attached, can operate.<br>• **Startup Margin**<br>Type **3** then select a number from 1 to 21 for possible values between -10dB through 10dB, or select 22 to completely Disable the margin (i.e., the target signal-to-noise margin, in decibels, that the modem must achieve with a BER of $10^{-7}$ or better to successfully complete synchronization). The default margin value is -10 dB. A lower margin may result in a higher data rate, but it can increase noise on the line. The default is -10 dB for the modem. |

| Step | Action |
|---|---|
| 2 (cont.) | • **Data Rate (kbps)**<br>Type **4** then select a data rate (number 1 through 34) which determines the maximum transmission rate, in kilobits per second, up to which the modem can negotiate and synchronize with another device (modem or a DSLAM) to which it is attached. When the Bit Rate Mode (see "Bit Rate Mode" below) is set to Fixed, the range of values are (ADC modems comply with the standard G.shdsl data rate range):<br>– for the MM702G2 modem, 384 kbps to 4608 kbps, in 128 kbps increments<br>– for the MM701G2 modem, 192 kbps to 2304 kbps, in 64 kbps increments<br>– Rates down to 64 kbps are supported only when operating in single-pair, point-to-point mode with another ADC modem. The default value is Adaptive. (see Chapter 7: Implementing a Point-To-Point LAN Extension).<br>• **Wire Pair Mode**<br>Type **5** then select a wire mode. For the MM701G2 modem, Single mode is the only setting available. For the MM702G2 modem, you can select 1 for Single, 2 for Dual mode, or 3 for Dual Enhanced mode. Single mode is the default. Wire mode indicates whether the G.shdsl modem is operating in a two-wire mode (Single), a four-wire mode (Dual), or a Dual Enhanced mode. Dual Enhanced mode is a two-pair rate-adaptive mode.<br>• **PSD Mode**<br>Type **6** then select which Power Spectral Density (PSD) which plots the variations of signal power with signal frequency for the G.shdsl transmission between the modem and the DSLAM or the modem and another modem. Select 1 for Symmetric PSD which indicates that the PSD mask for both sides of the transmission (the CO- and remote-side) are the same (symmetric).<br>Asymmetric PSD indicates that the PSD mask for both sides of the transmission (the CO- and remote-side) are not the same (asymmetric). There are two unique numeric values (AsymmetricRate1 and AsymmetricRate2) used to determine the asymmetric PSD mask based on the Annex A or Annex B standard that you selected. Select 2 for AsymmetricRate1 which is 784 kbps for Annex A and 2312 kbps for Annex B. Select 3 for AsymmetricRate2 which is 1552 kbps for Annex A and 2056 kbps for Annex B.<br>Both ends of the connection must be set for the same Symmetric or Asymmetric PSD. The default is Symmetric.<br>• **Bit Rate Mode**<br>Type **4** then select either *1* for Adaptive or *2* for Fixed mode. Bit rate mode indicates how the modem synchronizes with the device to which it is attached. The default for the modem is Adaptive mode. The following provides more description for each mode.<br>– **Fixed mode** indicates that the modem will synchronize with the other end (a DSLAM or another modem) at a fixed bit rate through negotiation. The modem will synchronize at the best rate, up to the data rate specified (see "Data Rate (kbps)" above), that can be achieved by both ends.<br>– **Adaptive mode** indicates that prior to modem negotiating a rate, the modem performs an adaptation phase during which it determines a best possible rate based on conditions of the line. After adaptive mode, the modem will then negotiate the best rate that can be achieved with the other end, based on the adaptation results. The default is Adaptive. |

| Step | Action |
|---|---|
| 2 (cont.) | • **Test Bit Rate**<br>Type **8** then select a rate (number 1 through 36) for the test bit rate. This test bit rate is used by the manufacturer for internal use only.<br>• **SNR Margin Limit**<br>Type **9** then enter a value from -64 to 63. This value indicates the minimum SNR margin (in decibels) that must exist when the G.shdsl connection is synchronized and in order for the DSL MAR LED to be lit ON Green. The default value is 6. |
| 3 | Type **5** to Apply the new configuration for the G.shdsl settings. |

### View G.shdsl Configuration

You can view G.shdsl current settings from the G.SHDSL Current Settings dialog. See "Complete an Advanced Configuration" on page A-20 for definitions of these parameters that you previously set.

From the G.SHDSL Menu, enter **1** to display the G.SHDSL Current Setting menu (Figure A-16).

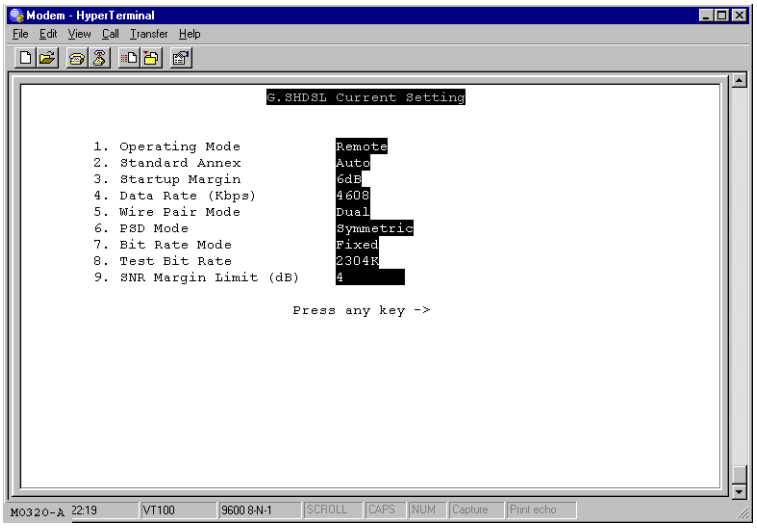



**Figure A-16. G.SHDSL Current Setting Menu**

### Monitor G.shdsl Statistics

From the G.SHDSL Menu, enter **4** to display the Quick Configuration Setting menu (Figure A-17).

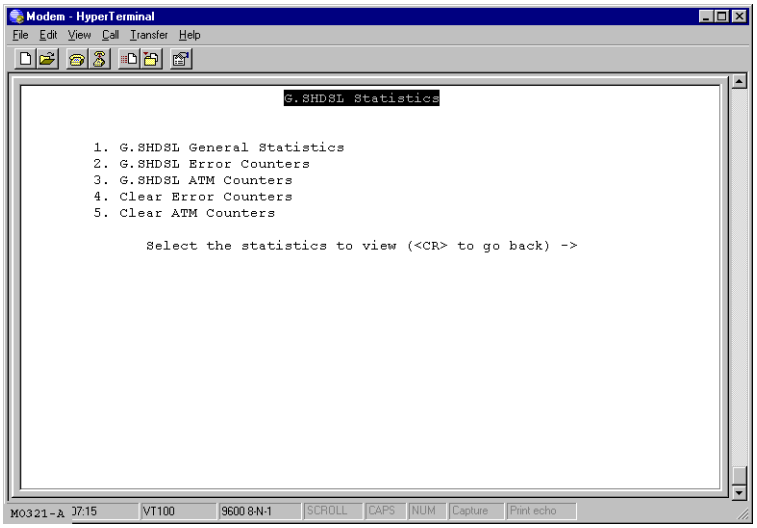



**Figure A-17. Quick Configuration Setting Menu**

View G.shdsl General Statistics

| Step | Action |
|---|---|
| 1 | From the G.SHDSL Statistic Menu, enter **1** to display the G.SHDSL General Statistics menu (Figure A-18). |

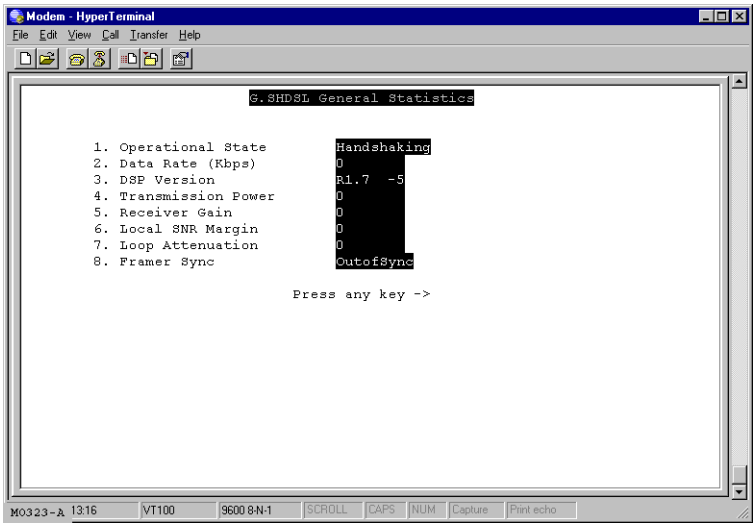



**Figure A-18. G.SHDSL General Statistics Menu**

| Step | Action |
|---|---|
| 2 | View the current statistics, as described below:<br>• **Operational State**<br>Indicates the current mode of the modem. Operational states include:<br>– **Handshaking**—indicates that the modem is negotiating with the DSLAM or the other modem<br>– **Training**—indicates that the modem is learning the connection parameters<br>– **Show time**—indicates the G.shdsl connection is operational<br>• **Data Rate**<br>Indicates the bit rate for this transmission on the G.shdsl connection.<br>• **DSP Version**<br>Identifies the version of G.shdsl firmware driver used for this modem.<br>• **Transmission Power**<br>Indicates the local transmission power in decibels.<br>• **Receiver Gain**<br>Indicates the amplifying factor for incoming signal in decibels.<br>• **Local SNR Margin**<br>Indicates the current value for the SNR margin in decibels.<br>• **Loop Attenuation**<br>Indicates the current and approximate loop attenuation (loop signal loss) in decibels.<br>• **Framer Sync**<br>Indicates the current status of G.shdsl framer synchronization. |

## View G.shdsl Error Counters

| Step | Action |
|---|---|
| 1 | From the G.SHDSL Statistic Menu, enter **2** to display the G.SHDSL Error Counters menu (Figure A-19). |

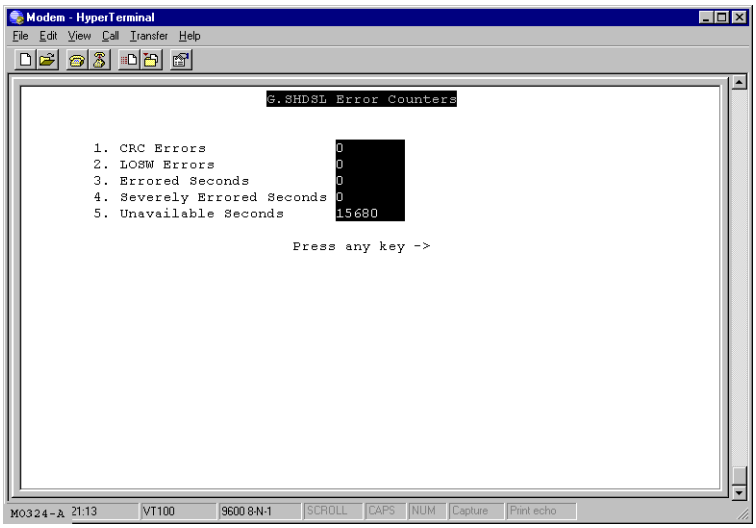
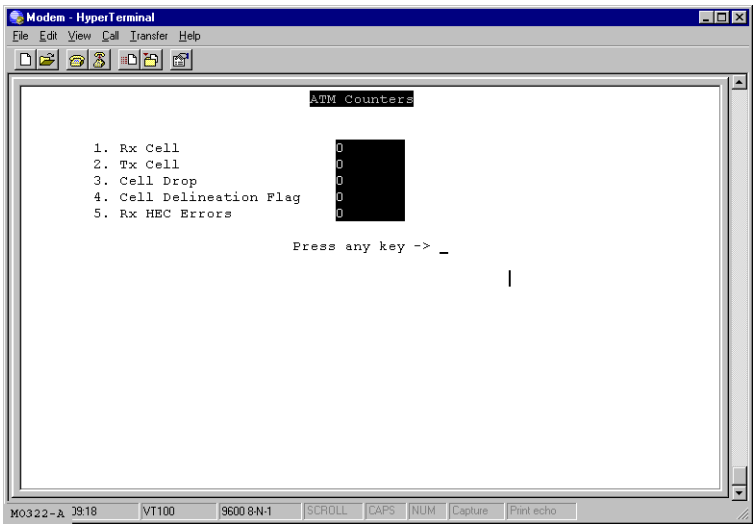



**Figure A-19. G.SHDSL Error Counters**

| | |
|---|---|
| 2 | View the current statistics, as described below:<br>• **CRC Error**<br>Indicates the total number of cyclic redundancy check (CRC) errors that have occurred on the G.shdsl connection since the last time that the G.shdsl error counters were cleared. CRC is an error checking technique used to ensure the integrity of data during transmission.<br>• **LOSW Errors**<br>Indicates the total number of cyclic redundancy check (CRC) errors that have occurred on the G.shdsl connection since the last time that the G.shdsl error counters were cleared. CRC is an error checking technique used to ensure the integrity of data during transmission.<br>• **Errored Seconds**<br>Indicates the total number of seconds in which one or more CRC errors occurred since the last time that the G.shdsl error counters were cleared.<br>• **Severely Errored Seconds**<br>Indicates the total number of seconds in which 50 or more CRC errors occurred since the last time that the G.shdsl error counters were cleared.<br>• **Unavailable Seconds**<br>Indicates the total number of seconds that the G.shdsl connection has been non-operational due to loss of synchronization or excessive errors since the last time that the G.shdsl error counters were cleared. |
| 3 | Click one of the following:<br>• **Clear**—resets all the counters to zero.<br>• **Refresh**—updates the page with current error counts. |

## View ATM Counters

| Step | Action |
|---|---|
| 1 | From the G.SHDSL Statistic Menu, enter **3** to display the ATM Statistics menu (Figure A-20).<br>  <br>**Figure A-20. ATM Statistics Menu** |
| 2 | View the current statistics, as described below.<br>• **Rx Cell**<br>Indicates the total number of cells received by the modem on the DSL interface.<br>• **Tx Cell**<br>Indicates the total number of cells transmitted by the modem over the DSL interface.<br>• **Cell Drop**<br>Indicates the total number of cells dropped by the modem.<br>• **Cell Delineation Flag**<br>Indicates if cell delineation errors have occurred on the modem. A 0 indicates that no errors have occurred A 1 indicates that errors have occurred.<br>• **Rx HEC Errors**<br>Indicates the total number of received ATM cells marked with uncorrectable header errors as indicated in the header-error control (HEC) byte. |
| 3 | Enter **5** on the G.SHDSL Statistic Menu to Clear the error counters. |

## RESTORING FACTORY DEFAULTS

When you configure the modem, you change the factory default settings to new values. You can return these parameters to their default values to provide a known starting point if you are troubleshooting or you simply want to configure new parameters. For session default values, see "Default Session Parameter Values" on page B-4.

There are three ways to reset the modem to its factory default values:

- Using the Command Line Interface (below)
- Using the Web Interface (see "Reset to Factory Defaults using the Web Interface" on page 9-13)
- Using the modem's Reset button (see "Reset to Factory Defaults using the Reset Button" on page 9-14)

***IMPORTANT***

***Active links are lost when you reset to factory default values.***

Restoring Factory Defaults

| Step | Action |
|---|---|
| 1 | From the System Management menu, enter **6** to Restore Factory Configuration (Figure A-21). |
| 2 | Do one of the following at the prompt:<br>• Enter **Y** if you want to return all values to their original factory values.<br>• Enter **N** if you do not want to return all values to their original factory values. |

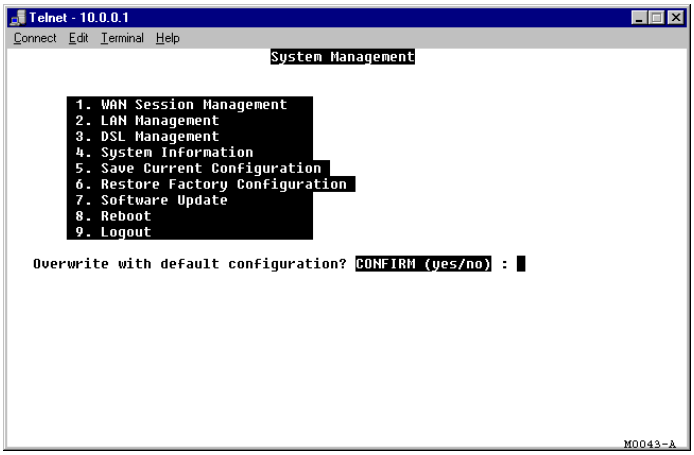
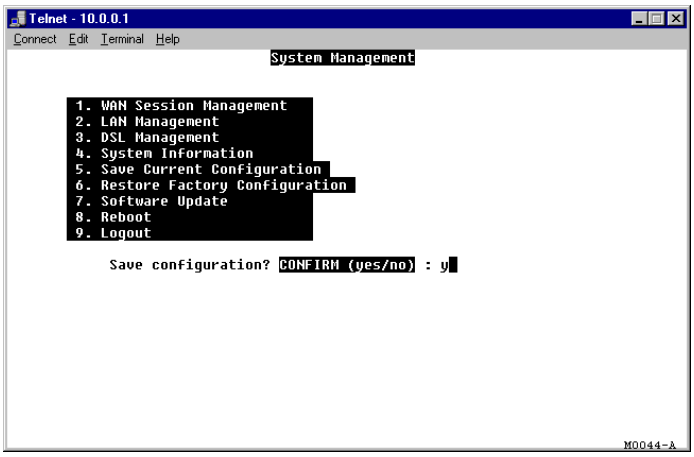



**Figure A-21. Restoring Factory Defaults**

## SAVING THE CURRENT CONFIGURATION

Use the Save Current Configuration page for saving your current configuration to flash memory. This prevents current changes from being lost in the event the modem is reset or power is cycled.

| Step | Action |
|---|---|
| 1 | From the Main Menu, enter **5** to Save Current Configuration.<br>  <br><br>**Figure A-22. Save Current Configuration** |
| 2 | Do one of the following at the prompt:<br>• Enter **Y** if you want to save the current configuration.<br>• Enter **N** if you do not want to save the current configuration, but return to the previous configuration. |

## UPDATING SYSTEM SOFTWARE

If you need to update the modem software, use the Web interface HTTP upgrade (see "Update System Software" on page 9-11). Through the Web interface HTTP upgrade capability, you can transfer software image (.tar).

**Note:** It is recommended that you use the Web interface HTTP to download software.

**Note:** After uploading code V3.2.0 to the modem using HTTP, perform Factory Defaults using the Reset Button.

## VIEWING SYSTEM INFORMATION

The System Information page is a read-only summary of the current modem configuration. It includes information about the firmware release, model, release date, MAC address, and DSP version. This information is often used by technical support when troubleshooting.

From the Main Menu, enter **4** for System Information (Figure A-23).

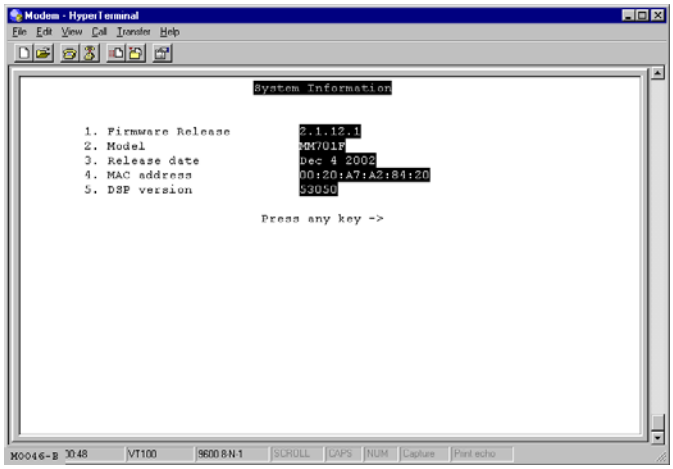
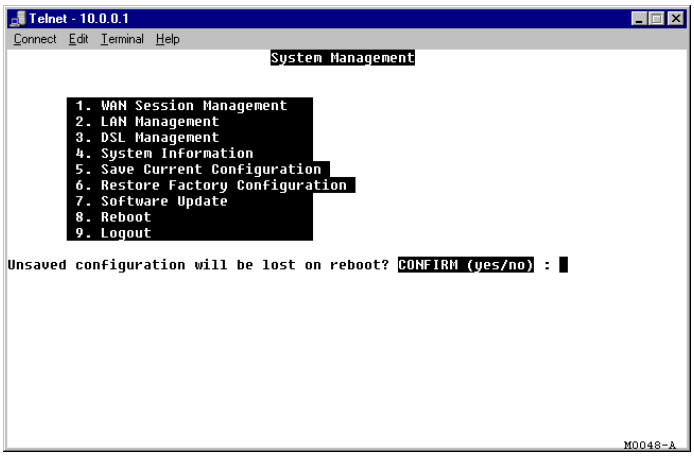



**Figure A-23. System Information**

## REBOOTING THE MODEM

Before you reboot the modem, save configuration changes as described in "Saving the Current Configuration" on page A-28.

| Step | Action |
|---|---|
| 1 | From the Main Menu, enter **8** to Reboot.<br>  <br><br>**Figure A-24. Rebooting the Modem** |
| 2 | Do one of the following at the prompt:<br>• Enter **Y** if you want to reboot the modem.<br>• Enter **N** if you want to cancel the reboot. |

**Note:** Refer to “Rebooting the Modem” on page 5-14 for detailed information about rebooting the modem from the Web Interface.

**Note:** Refer to “Rebooting the Modem with the Reset Button” on page 1-6 for detailed information about rebooting the modem using the reset button located on the back panel of the modem.

# Appendix B

## SPECIFICATIONS

The MM701G2 and MM702G2 are DSL modems that take advantage of G.shdsl technology by offering fixed and rate-adaptive communication at equal rates going both upstream and downstream. In addition, the modems also provide sessions for precise control of security, performance and management of users and resources per session; allowing Service Providers to offer additional services and class of service for Internet access, private ATM networks or connections to application servers like video servers or voice gateways. Also provided is self-installation for non-technical users.

### OVERVIEW

- The MM701G2 provides fixed-rate or rate-adaptive, symmetric G.shdsl transmission up to 2.304 Mbps
- The MM702G2 provides fixed-rate or rate-adaptive, symmetric G.shdsl transmission up to 4.608 Mbps
- PPPoE
- PPP over ATM (RFC 2364)
- RFC 1483 bridging over ATM AAL5
- RFC 1483 routing over ATM AAL5 (IPoA)
- 32 simultaneous WAN sessions
- support for point-to-point LAN extension (Bridging & Routing)
- DHCP (client and server) for sending and receiving dynamic IP addresses, DHCP default gateway, and DNS server
- DHCP Relay
- DNS Relay
- NAT for IP address translation
- Web interface HTTP upgrade for modem software updates
- Static Routing
- RIP versions 1 and 2 for dynamic IP routing information exchange
- multiple management options:
  - serial interface
  - telnet
  - Web interface
- SNMP agent
- 10/100Base-T LAN interface with MDI/MDI-X switch
- front panel LEDs for troubleshooting and monitoring LAN and DSL connections
- PAP and CHAP for PPP login name and password authentication
- ATM Quality of Service selection
- statistics for monitoring network traffic
- F4/F5 OAM support
- Reset Button (Reset/Factory Defaults)

## DATA SPECIFICATIONS

- VLAN Support
- The MM701G2 and MM702G2 modems allow larger packet sizes to accommodate VLAN traffic (Maximum: 1536 Bytes with CRC).
- DSL Standards
  - Annex A (G.991.2)
  - Annex B (G.991.2)
- ATM standards
  - ATM Forum UNI Version 3.1 and UNI Version 4.0
  - ITU-T Q.2931, Q.2971 signaling
  - ITU I.363.5 ATM Adaptation Layer 5
  - ITU I.432 Cell Delineation and HEC
  - ITU I.361 ATM Cell Format
- Classes of Service: CBR, UBR
- Virtual Circuits: 32 for data
- Internetworking Features
  - PPP: 1332, 1661, 1638, 1570
  - NAT: 1631
  - DHCP Server & Client: 2131, 2132
  - Dynamic IP routing, ARP: 826, RIP: 1058, 1723
  - TCP/IP: 1112, 1122, 950, 894, 793, 791, 1812
  - BOOTP: 951, 1542
  - TFTP: 1350
  - IP over ATM: 1577
  - RIP V2: 1723
- WAN Protocols
  - IETF RFC 2364 PPP over AAL5 (VC multiplexing and LLC encapsulation)
  - IETF RFC 2684 Multiprotocol encapsulation over AAL5
  - IETF RFC 1577 Classical IP over ATM
- Security
  - PPP authentication - PAP/CHAP: 1334, 1994
  - Web, Craft console, and Telnet password with different user administration levels
- Management
  - Embedded SNMP agent, Terminal, Telnet with Web based configuration and management tool
  - Auto provisioning extensions
  - Concise MIB: 1212, MIB-II: 1213, Bridge MIB: 1493
  - SNMP MIB: 1471, 1472, 1473, 1474
  - SNMP: 1157
- Remote Configuration
  - Software Upgrade
  - HTTP download into built-in flash memory
- Encapsulation
  - When you activate RFC 1483 system mode, you can select WAN encapsulation as VC multiplexing for some sessions and LLC encapsulation for other sessions.

- PPP
  - Authentication (PAP/CHAP)—Provides authentication of PPP sessions for security through Password and Challenge-Handshake Authentication Protocols (RFC 1994).
  - Network Address Translation—Network Address Translation (NAT) maps LAN side private IP address to the public IP address assigned to the 32 virtual channels (RFC 1631).
- Routing
  - Routing Protocol—Supports RFC 1724 Routing Information Protocol (RIP and RIP Version 2).
  - Encapsulation—Supports Logical Link Control (LLC) or VC-based multiplexing (RFC 1483).
  - Static Routes—Supports up to 32 static routes.
  - Address Resolution—Supports Address Resolution Protocol (ARP) over the LAN port (RFC 826).
- Bridging
  - Bridging and Address Learning—Implements a transparent learning bridge with a bridging table of 1024 entries.
  - Encapsulation—Supports Logical Link Control (LLC) or VC-based multiplexing (RFC 1483).
  - Spanning Tree—Provides Spanning Tree support per IEEE 802.1d.
- RFCs
  - RFC 1483 Multiprotocol Encapsulation over ATM (Bridging/Routing)
  - RFC 2364 PPP Encapsulation over ATM
  - RFC 1994 for PAP/CHAP Authentication
  - RFC 1631 IP Network Address Translator (for NAPT)
  - RFC 1350 for TFTP client
  - RFC 2131 and RFC 2132 for DHCP server and relay protocols (supported only in RFC 1483 Bridging mode) and extensions, respectively
- MIBs
  - Bridge MIB - 2684
  - SNMP MIBs - 1471, 1472, 1473, 1474
  - MIB 1213 - MIB II

## DEFAULT SESSION PARAMETER VALUES

| Session Parameter | Bridge | IPoA Router | PPPoA-Router | PPPoE-Router |
|---|---|---|---|---|
| Protocol | RFC1483 - Bridge | RFC1483 - Router | PPPoA | PPPoE |
| State | Enable | Enable | Enable | Enable |
| IP Address | N/A | 0.0.0.0 | N/A (Dynamic) | N/A (Dynamic) |
| Subnet Mask | N/A | 255.0.0.0 | N/A (Dynamic) | N/A (Dynamic) |
| NAT | Not applicable | Disabled | Disabled | Disabled |
| RIP Send | N/A | RIPv2(Bcast) | RIPv2(Bcast) | RIPv2(Bcast) |
| RIP Accept | N/A | RIP I & II | RIP I & II | RIP I & II |
| Virtual Path ID (VPI: 0 - 4095) | 0 | 0 | 0 | 0 |
| Virtual Channel ID (VCI: 32 - 65536) | 0 | 0 | 0 | 0 |
| ATM QoS | UBR | UBR | UBR | UBR |
| QoS Peak Cell Rate (PCR) | 5500 | 5500 | 5500 | 5500 |
| QoS Sustainable Cell Rate (SCR) | 0 | 0 | 0 | 0 |
| QoS Maximum Burst Size (MBS) | 0 | 0 | 0 | 0 |
| Encapsulation | LlcBridged | LlcRouted | VCMUX | VCMUX |
| Login Name | N/A | N/A | N/A | N/A |
| Login Password | N/A | N/A | N/A | N/A |
| Authentication | N/A | N/A | NONE | NONE |

## HARDWARE SPECIFICATIONS

- LED
- Power (where: x=1, 2-Wire; x=2, 4-Wire)
  - MM70xG2-003 using 120 VAC, 60 Hz
  - MM70xG2-004 using 230 VAC, 50 Hz
  - MM70xG2-005 using 230 VAC, 50 Hz
- Operating Temperature of the modem: 0~50°C
- Power Adapter Spec:
  - Input: 100~240 VAC, 50/60 Hz, 0.3 A
  - Output: 6 VDC, 2 A
- Ethernet: Link, Tx, Rx, Collision
- DSL: Sync, Tx, Rx, Margin
- Connectors
  - DSL Interface: RJ-11
  - 10/100Base-T: RJ-45
  - Console Port: RJ-45 (serial connection to RS-232 for local configuration)
- LAN Interface
  - 10/100Base-T (IEEE 802.3i)
  - Connector: RJ-45 with MDI/MDI-X switch
- WAN Interface
  - G.shdsl (Symmetrical High-Speed Digital Subscriber Line)
- Maximum transmission rate:
  - Downstream – 2304 kbps for single-pair; 4608 kbps for two-pair
  - Upstream – 2304 kbps for single-pair; 4608 kbps for two-pair
- Minimum transmission rate to sync
  - 192 kbps for MM701G2
  - 384 kbps for MM702G2
- Connector
  - RJ-11
- ATM (Asynchronous Transfer Mode)
  - ATM Adaptation Layer - AAL5 (ITU I.363.5)—Supports encapsulation and de-encapsulation of AAL5 Protocol Data Units (PDUs) for convergence. Segmentation and Reassembly (SAR) layer segments and reassembles AAL5 PDUs into ATM cells that are 48 byte SAR-PDUs.
- ATM Layer - Attaches or strips the 5-byte header to the 48-byte SAR-PDU.
  - Cell Format - Complies with ITU I.361 ATM cell format. Cell delineation complies with ITU I.432 Cell Delineation and HEC. Cells are fixed length (53 bytes), including 5 bytes of header and 48 bytes of payload. Included in the header are the VPI and VCI number.
- Virtual Circuit type - Permanent Virtual Circuit (PVC) per ATM forum UNI Version 3.1.
  - Maximum Virtual Circuits - 32 virtual circuits that can simultaneously connect to service providers for sessions encapsulated either as PPP or RFC 1483 Bridging/Routing.

## CONNECTOR PINOUTS

The following sections provide the pinout information for the various modem connectors.

- **DSL Port (RJ-11)**

Table B-1 shows the signal on each pin of the DSL port for a 2-wire G.shdsl application. The connector for this interface is an RJ-11. The modem accommodates Tip and Ring reversal on this one loop.
See Connect Cables on page 1-3 for the location of this port.

**Table B-1. DSL Port (RJ-11) (2-Wire)**

| Pin | Signal |
|---|---|
| 1 | Not used |
| 2 | No connection |
| 3 | Tip (Loop A) |
| 4 | Ring (Loop A) |
| 5 | No connection |
| 6 | Not used |

Table B-2 shows the signal on each pin of the DSL port for a 4-wire G.shdsl application. The connector for this interface is an RJ-11. The modem accommodates Tip and Ring reversal on each separate Loop A and Loop B.
SeeConnect Cables on page 1-3 for the location of this port.

**Table B-2. DSL Port (RJ-11) (4-Wire)**

| Pin | Signal |
|---|---|
| 1 | Not used |
| 2 | Tip (Loop B) |
| 3 | Tip (Loop A) |
| 4 | Ring (Loop A) |
| 5 | Ring (Loop B) |
| 6 | Not used |

- **10/100Base-T Port (RJ-45)**

Table B-3 shows the signal on each pin of the 10/100Base-T port connector when the switch is in either the MDI or the MDI-X position. The connector for this interface is an RJ-45. See Connect Cables on page 1-3 for the location of this port.

**Table B-3. 10/100Base-T Port (RJ-45)**

| MDI | MDI-X Signal | Signal | Description |
|---|---|---|---|
| 1 | 3 | TX+ | Transmit Data (+) |
| 2 | 6 | TX- | Transmit Data (-) |
| 3 | 1 | RD+ | Receive Data (+) |
| 4 | 4 | Not used | Not used |
| 5 | 5 | Not used | Not used |
| 6 | 2 | RD- | Receive Data (-) |
| 7 | 7 | Not used | Not used |
| 8 | 8 | Not used | Not used |

- **Console Port (RJ-45)**

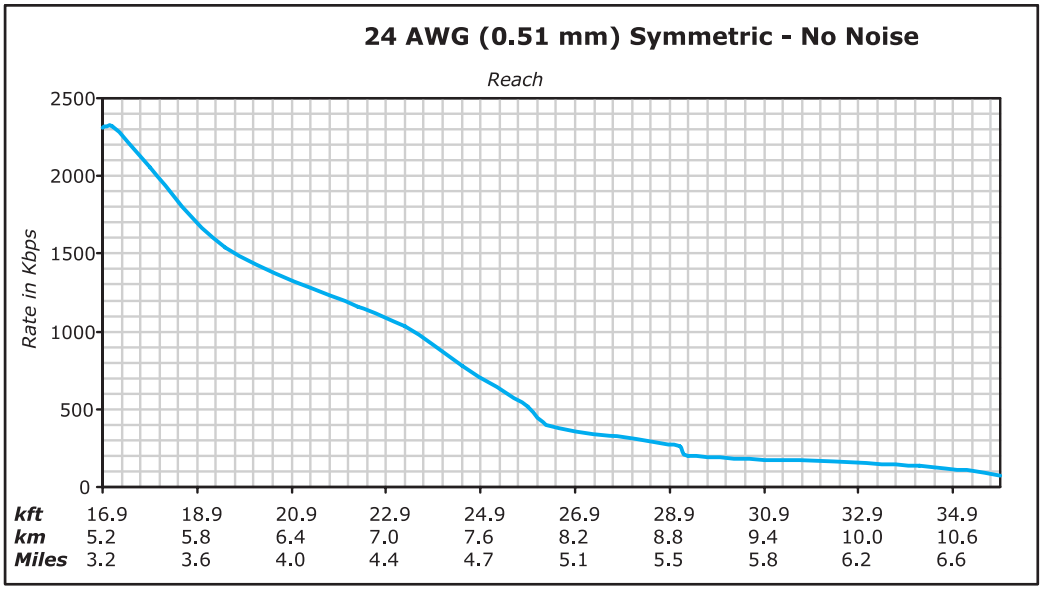
Table B-4 gives the signal designations and pin numbers for each end of the RJ-45 to RS-232 cable that is used between the modem Console port (RJ-45) and the PC Serial port (DB-9).

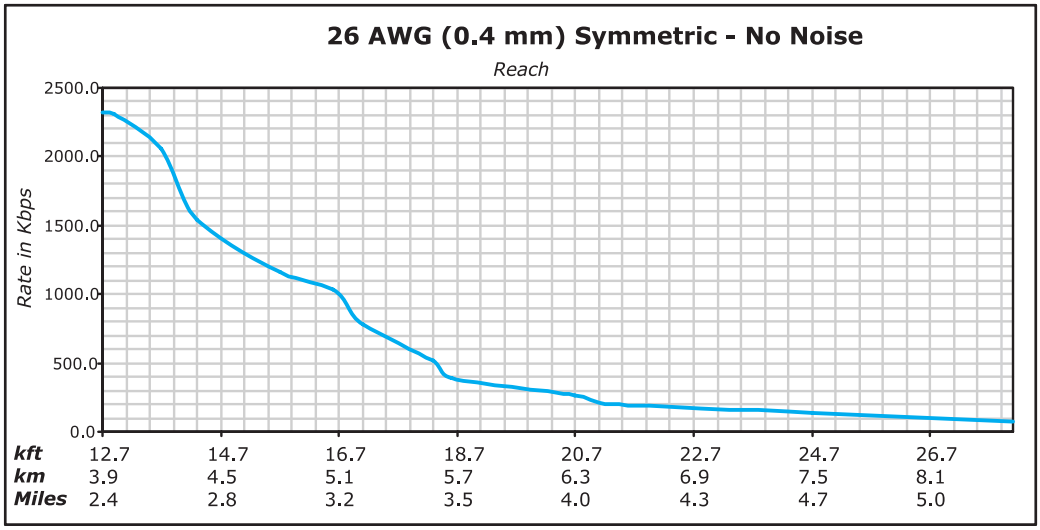
**Table B-4. Console Port (RJ-45)**

| PC RS-232 Serial (DB-9) | Modem Console (RJ-45) | Signal | Description |
|---|---|---|---|
| | 1 | | |
| 2 | 2 | RXD | Receive Data |
| 3 | 3 | TXD | Transmit Data |
| | 4 | | |
| 5 | 5 | GND | Ground |
| | 6 | | |
| | 7 | | |
| | 8 | | |

## RATE VS REACH

The following rate versus reach charts show values per each G.shdsl loop (Loop A or Loop B).



# Appendix C

## PRODUCT SUPPORT

ADC Customer Service Group provides expert pre-sales support and training for all of its products. Technical support is available 24 hours a day, 7 days a week by contacting the ADC Technical Assistance Center.

| | |
|---|---|
| **Sales Assistance: 800.366.3891** | Quotation Proposals, Ordering and Delivery General, and Product Information |
| **Systems Integration: 800.366.3891** | Complete Solutions (from concept to installation), Network Design and Integration Testing, System Turn-Up and Testing, Network Monitoring (upstream or downstream), Power Monitoring and Remote Surveillance, Service/Maintenance Agreements, and Systems Operation |
| **ADC Technical Assistance Center: 800.366.3891**<br><br>**Email: wsd.support@adc.com** | Technical Information, System/Network Configuration, Product Specification and Application, Training (product-specific), Installation and Operation Assistance, and Troubleshooting and Repair/Field Assistance |
| **Online Technical Support:** | www.adc.com/Knowledge_Base/index.jsp |
| **Online Technical Publications:** | www.adc.com/documentationlibrary/technicalpublications/ |
| **Product Return Department: 800.366.3891**<br><br>**Email: repair.return@adc.com** | ADC Return Material Authorization (RMA) number and instructions must be obtained before returning products. |

# GLOSSARY

## Symbol

**10/100Base-T** – The Institute of Electrical and Electronic Engineers (IEEE) 802.3 specification for Ethernet over thin coaxial cable.

## A

**AAL2** – ATM Adaptation Layer 2. Used for compressed voice and video that is intolerant of delay. This layer is used by xDSL technology.

**AAL5** – ATM Adaptation Layer 5. AAL5 has been adopted by the ATM Forum from a Class of Service called High Speed Data transfer. It typically supports all types of data traffic. Originally designed to support TCP/IP.

**ADSL** – Asymmetric Digital Subscriber Line

**ATM** – Asynchronous Transfer Mode is a high bandwidth, low delay, connection-oriented, packet-like switching and multiplexing technique that uses 53-byte fixed-size cells to transmit voice, video and data over a network. ATM layers define how cells are formatted and provides the transport of the fixed length cells between the modem and the service provider (or endpoints of the virtual connection).

**attenuation** – The dissipation of the power of a transmitted signal as it travels over copper wire, measured in decibels (dB).

**authentication** – Security feature offered through PAP and CHAP with PPP sessions.

BERBit Error Rate is a measure of transmission quality. The ratio of error bits to the total number of bits transmitted.

## B

**bps** – bit-per-second is the number of bits transferred during each second of data transmission.

## C

**CBR** – Constant Bit Rate is a Service Class for the modem. It provides constant bit rate data with a timing relationship between the source and the destination. Also, a traffic class that carries a guaranteed constant bandwidth. Best suited for applications that require fixed bandwidth, such as uncompressed voice, video and circuit emulation. CBR is a Quality of Service class defined by the ATM Forum for ATM networks.

**cell** – A fixed-length packet.  Also, the unit of data transmission used in ATM. Each ATM cell contains a fixed-size frame (53 bytes) consisting of a five-byte header and a 48-byte payload.

**community string** – A text string required for an SNMP trap to be received by a trap receiver(s). Also, a text string that identifies an SNMP community and is associated with specific access rights (read-only or read/write).

**CRC** – Cyclic Redundancy Check is a method used to verify the accuracy of data transmission.

## D

**DHCP** – Dynamic Host Configuration Protocol. A TCP/IP protocol that enables PCs to obtain IP addresses from a DHCP server that dynamically assigns IP addresses.

**DNS** – Domain Naming System. A system for translating names of host computers into IP addresses.

**downstream traffic** – Communications from a service provider to a user.

## E

**encapsulation** – The inclusion of data in a protocol header prior to transmission, which enables successful data transmission between different protocol networks.

**ES** – Errored Seconds is the seconds during which errors occur that prevent the payload from being corrected.

**Ethernet** – A protocol used for LAN traffic, which has a transfer rate of 10 or 100 Mbps.

## F

**flash memory** – Non-volatile memory that can be erased and reprogrammed.

## G

**G.shdsl** – Symmetrical High-Speed Digital Subscriber Line

**gateway** – A device (generally a router) that provides translation services to allow communication between two dissimilar networks.

## I

**IP** – Internet Protocol is a TCP/IP protocol that controls packet transmission.

**IP address** – A 32-bit address used in IP routing. The address consists of four octets separated by decimals. The octets comprise a network section, a subnet section (optional) and a host section.

## L

**LAN** – Local Area Network is a physically connected group of devices between which data transmission occurs at high speeds over relatively short distances.

**LLC** – Logical Link Control is an encapsulation protocol for data that you transmit from the modem over the WAN in 1483 Bridging/Routing mode.

**LOF** – Loss Of Frame is an error indicating that the receiving equipment has lost a frame.

**LOS** – Loss Of Signal is an error indicating that the receiving equipment has lost the signal.

## M

**MAC** – Media Access Control is a physical address associated with a device such as a NIC. For modem configuration, the MAC is used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Used with 1483 Bridging/Routing Mode.

**margin** – The noise margin in decibels that the modem must achieve with a BER of 10 -7 or better to successfully complete initialization.

**MIB** – Management Information Base is a set of variables that define the configuration and status parameters for network management. Network management stations can retrieve information from and write information to an MIB. The Internet Engineering Task Force (IETF) specifies standard MIBS for certain types of devices, ensuring any NMS can manage the devices. Vendors can specify proprietary MIBs for their devices to fit specific needs.

## N

**NAT** – Network Address Translation provides the means to map private IP addresses (LAN IP addresses) to public IP addresses (WAN session IP addresses).

**NVRAM** – Non–Volatile Random Access Memory is a medium for storing system configuration information, so the information is not lost when the system is reset.

**octet** – A TCP/IP term indicating eight bits.

## P

**PAP/CHAP** – Password Authentication Protocol and Challenge Handshake Authentication Protocol are two ways to authenticate PPP sessions. With PAP, the modem sends authentication requests to the service provider and authentication occurs only once during the life of the link.

In CHAP, the service provider returns an authentication challenge to the modem during authentication. CHAP can be renegotiated during the life of the link. Also, both the modem and the service provider must support clear text versions of the password. The CHAP host field must be the same on both ends of the session.

**PDU** – Protocol Data Unit is data as it appears at the interface between a particular sublayer and the sublayer immediately below.

**POTS** – Plain Old Telephone Service.

**PPP** – Point-to-Point Protocol exists between the hardware layer and the network-layer interface protocols. It is a widely used protocol for establishing connections on the Internet. PPP provides the set up and release of connections for each session. PAP/CHAP provide the authentication for the PPP sessions.

**proxy IP address** – The proxy IP address is the WAN IP address for one of the 32 sessions. The proxy IP address is used to enter static NAT entries. See IP address.

**PVC** – Permanent Virtual Circuit is a logical connection comprised of a predefined static route across a packet-switched network that is always in place and always available.

## Q

**QoS** – Quality of Service is the configured traffic parameters that are assigned to a virtual circuit, which specifies how quickly and how accurately data is transferred from the sender to the receiver.

## R

**RFC** – Request For Comment is a series of notes that contain surveys, measurements, ideas, techniques, and observations, as well as proposed and accepted TCP/IP protocol standards. RFCs are available on the Internet.

**RIP** – Routing Information Protocol allows routers to update the routing tables automatically (for example with information such as how many hops between destinations). The version of RIP you select for the session must match the version supported by the service provider. Versions RIP1 and RIP-1 compatible are used for broadcast. Version RIP 2 is used for multicast.

## S

**SEF** – Severely Errored Frames is the incoming signal has at least four consecutive errored framing patterns.

**SES** – Severely Errored Seconds is the seconds during which more than 2,500 bipolar errors are detected on the line.

**session** – The time during which two computers maintain a communication connection. An example is a connection configured between the Megabit Modem and the service provider.

**SNMP** – Simple Network Management Protocol is a protocol that specifies how to send information between a NMS and managed devices on a network. The managed devices run a program called an agent. The agent interprets SNMP request and responds to them. SNMP is used to set device configurations, read device configurations or read the device status.

**Spanning Tree** – A bridging protocol that detects and prevents loops from occurring in a system containing multiple bridges.

**subnet mask** – A type of IP address that allows a site to use a single IP address for multiple physical networks.

## T

**TCP** – Transmission Control Protocol is a transport protocol used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Establishes connection with remote user before data transmission.

**TCP/IP** – Transmission Control Protocol/Internet Protocol is a protocol used for communications between computers over networks and the internet.

**TFTP** – Trivial File Transfer Protocol is a protocol used to download card images or other files from an external TFTP server to the NVRAM of any installed cards, or to upload files from an installed card to an external TFTP server.

**trap receivers** – PCs configured to receive SNMP traps (messages).

**traps** – Autonomous, interrupt-driven, SNMP messages sent from a managed node to a network management station to indicate that an event has occurred.

## U

**UAS** – UnAvailable Seconds is the number of seconds during which the line is unavailable.

**UBR** – Unspecified Bit Rate is an ATM traffic type used for LAN traffic. When network congestion occurs, the data is stored in a buffer until it can be sent.

**UDP** – User Datagram Protocol is a transport protocol used to map inbound traffic (from a remote IP address) to an internal (LAN) IP address. Uses a protocol port number for the destination at the remote location.

upstream trafficCommunications from a user to a service provider.

## V

**VCI** – Virtual Channel Identifier is a 16-bit field addressing identifier in the header of an ATM cell used to route cell traffic. It identifies a particular VC link for a given VP.

**VCMUX** – Virtual Channel Multiplexer-based encapsulation used for networks with large numbers of virtual channels making it practical to carry a single protocol per virtual channel.

**VCA** – Virtual Channel is a logical connection in the ATM network over which ATM cells are transmitted.

**VPI** – Virtual Path Identifier is an 8-bit field addressing identifier in the header of an ATM cell that is used to route cell traffic. It identifies a particular VP link.

**VP –** A Virtual Path is a group of VCs carried between two points. The VP provides a means of bundling traffic traveling in the same direction. VPs are defined by a unique VPI value.

## W

**WAN** – Wide Area Network is a network consisting of nodes located across a large geographical area. Also, the connection between a service provider and MM Modem.

# *Certification and Warranty*

## Limited Warranty

Product warranty is determined by your service agreement. Refer to the *ADC Warranty/Software Handbook* for additional information, or contact your sales representative or Customer Service for details.

## Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by ADC voids the user's warranty.

All wiring external to the products should follow the provisions of the current edition of the National Electrical Code.

## FCC Class A Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Safety Standards Compliance

This equipment has been tested and verified to comply with the applicable sections of the following safety standards:

- GR 63-CORE - Network Equipment-Building System (NEBS) Requirements
- GR 1089-CORE - Electromagnetic Compatibility and Electrical Safety
- Binational Standard, UL-60950 3rd Edition/CSA1459 C22.2 No. 60950-00: Safety of Information Technology Equipment

For technical assistance, refer to "Appendix C: Product Support" on page C-1.

**World Headquarters**
ADC Telecommunications, Inc.
PO Box 1101
Minneapolis, MN 55440-1101 USA

**For Technical Assistance**
Tel: 800.366.3891

# Megabit Modem® MM701G2 & MM702G2
## User Manual

Product Catalog: MM701G2 and MM702G2

Document Number: MM70xG2-UM-03

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